



# NSO evo3S MPU Installation Manual

ENGLISH



# Preface

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## Disclaimer

As Navico is continuously improving this product, we retain the right to make changes to the product at any time which may not be reflected in this version of the manual. Please contact your nearest distributor if you require any further assistance.

It is the owner's sole responsibility to install and use the equipment in a manner that will not cause accidents, personal injury or property damage. The user of this product is solely responsible for observing maritime safety practices.

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### Europe

Navico declare under our sole responsibility that the product conforms with the requirements of:

- CE under RED 2014/53/EU

### United States of America

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### ISED Canada

This device complies with ISED (Innovation, Science and Economic Development) Canada's license-exempt RSSs. Operation is subject to the following two conditions: (1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device.

La traduction française de ce document est disponible sur le site Web du produit.

## Australia and New Zealand

Navico declare under our sole responsibility that the product conforms with the requirements of:

- level 2 devices of the Radiocommunications (Electromagnetic Compatibility) standard 2017

## Internet usage

Some features in this product use an internet connection to perform data downloads and uploads.

Internet usage via a connected mobile/cell phone internet connection or a pay-per-MB type internet connection may require large data usage. Your service provider may charge you based on the amount of data you transfer. If you are unsure, contact your service provider to confirm rates and restrictions.

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## Navico product references

This manual refers to the following Navico products:

- Broadband Radar<sup>™</sup> (Broadband Radar)
- Broadband 3G<sup>™</sup> (Broadband 3G Radar)
- Broadband 4G<sup>™</sup> (Broadband 4G Radar)
- Halo<sup>™</sup> Pulse Compression Radar (Halo Radar)

## About this manual

Images used in this manual might not exactly match the screen on your unit.

## Important text conventions

Important text that requires special attention from the reader is emphasized as follows:

→ **Note:** Used to draw the reader's attention to a comment or some important information.

**⚠ Warning:** Used when it is necessary to warn personnel that they should proceed carefully to prevent risk of injury and/or damage to equipment/personnel.

## Intended audience

This manual is written for system installers.

The manual assumes that the reader has basic knowledge about this type of equipment with regards to:

- installation work to be carried out
- nautical terminology and practices

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# 1

## Introduction

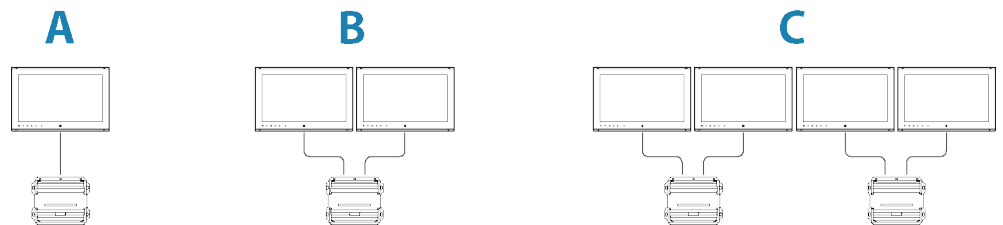
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### System overview

The basic system consists of the processor and one or two monitors.

The system can be configured and installed in various configurations:

- One processor with one monitor (**A**)
- One processor with two independent monitors (**B**)
- A complex network where additional networked processors are connected to independent monitors throughout the boat (**C**)



### Operating the system

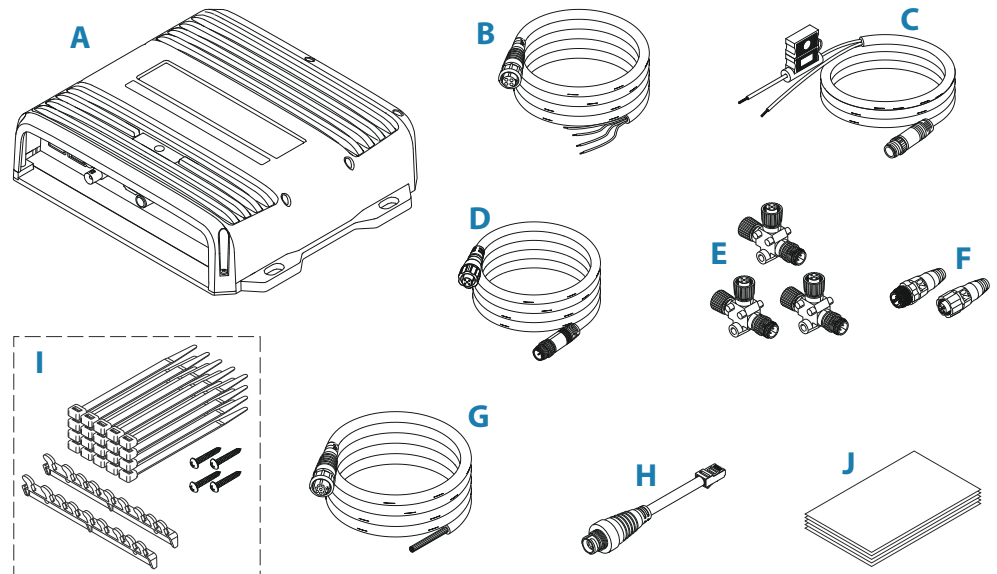
The system supports single and dual touch-screen operation when compatible touch monitors are connected.

If a compatible remote controller is available on the network, this can control multiple processors and monitors, including power control. A separate manual is delivered with the remote controller units.

You can also use a keyboard and mouse/trackball to control the system. Once these devices are connected to the USB ports on a processor, they can be used to control the monitors connected to the same processor.

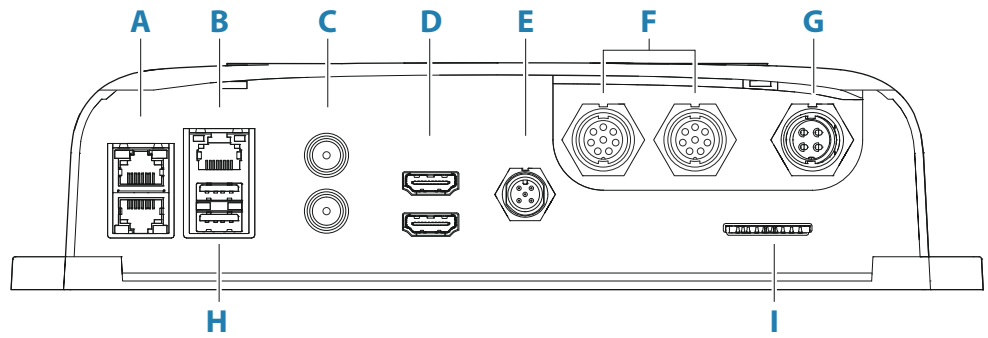
The active controller is indicated with an icon in the status bar.

## Parts included



- A** NSO evo3-S Marine Processor Unit (MPU)
- B** MPU Power cable, 2 m (6.5')
- C** Micro-C power cable, 1.3 m (4.3')
- D** Micro-C drop cable, male-female plugs, 1.8 m (6')
- E** Micro-C T-connectors (x3)
- F** Micro-C terminators, 120 ohm, (male and female)
- G** NMEA 0183 serial cable, 8 wires, 2 m (6.5')
- H** Ethernet adaptor, 5 pin female to RJ45 male
- I** Installation kit:
  - Cable retainers (x2)
  - Cable ties (x20)
  - Pan head screws, 3.5 x 19, A4 DIN7981B (x8)
- J** Documentation pack

## Connectors



NETWORK 1 PoE 15W COMBINED	NETWORK 3 USB 1	VIDEO 1 IN	HDMI 1 OUT	NMEA2000	SERIAL 1	SERIAL 2	POWER 45W MAX
NETWORK 2	USB 2	VIDEO 2 IN	HDMI 2 OUT			SD CARD	

- A** Network 1 and Network 2 ports (Ethernet with PoE)
- B** Network 3 (Ethernet)
- C** Video 1 IN and Video 2 IN
- D** HDMI 1 OUT and HDMI 2 OUT
- E** NMEA 2000
- F** Serial 1 and Serial 2
- G** Power
- H** USB 1 and USB 2
- I** SD card reader

# 2

## Installation

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### General mounting guidelines

**⚠ Warning:** Do not install the unit in a hazardous/flammable atmosphere.

→ **Note:** Choose a mounting location that will not expose the unit to conditions that exceed the technical specifications.

#### Mounting location

Ensure that the selected area allows for:

- cable routing, cable connection and cable support
- connection and use of portable storage devices
- viewing any LED indicators
- easy access to serviceable parts

Do also consider:

- the free space around the unit to avoid overheating
- the mounting surface's structure and strength, with regard to the weight of the equipment
- any mounting surface vibration that might damage the equipment
- hidden electrical wires that might be damaged when drilling holes

#### Ventilation

Inadequate ventilation and subsequent overheating of the unit will cause unreliable operation and reduced service life.

If possible, select a location where the vessel's air conditioning system can be used to control the temperature.

Ensure that any ventilation holes are not blocked.

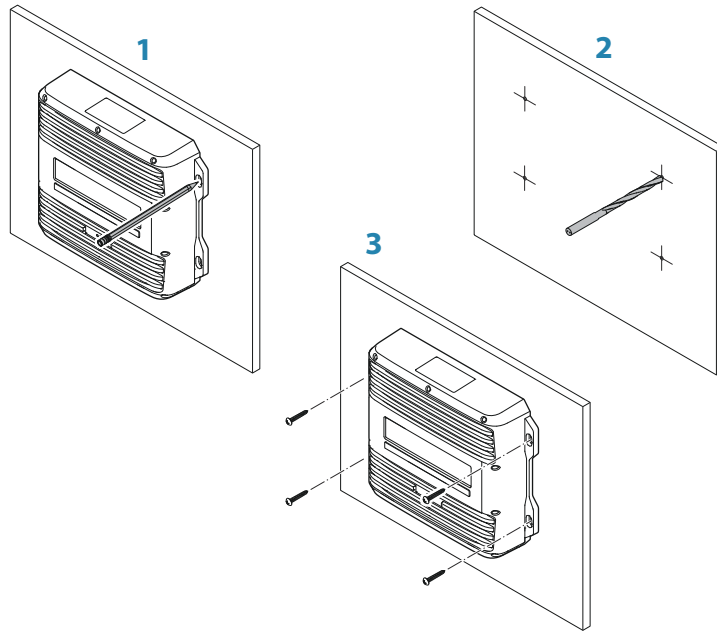
#### Electrical and radio frequency interference

This unit conforms to the appropriate Electromagnetic Compatibility (EMC) regulations. To ensure that the EMC performance is not compromised, the following guidelines apply:

- separate battery used for the vessel engine
- minimum 1 m (3 ft) between the device, the device's cables and any transmitting equipment or cables with radio signals
- minimum 2 m (7 ft) between the device, the device's cables and the SSB radio
- more than 2 m (7 ft) between the device, the device's cables and the radar beam



## Wall mounting

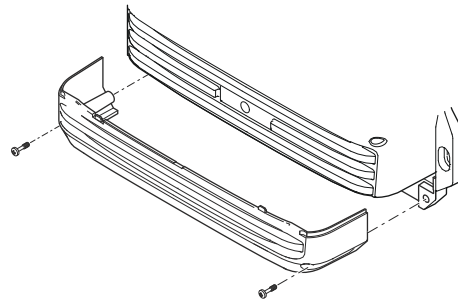


# 3

## Wiring

### Access to connectors

For easier access to connectors, remove the bottom front of the unit.



### Wiring guidelines

Don't:

- Make sharp bends in the cables
- Run cables in a way that allows water to flow down into the connectors
- Run the data cables adjacent to radar, transmitter, or large/high current carrying cables or high frequency signal cables.
- Run cables so they interfere with mechanical systems
- Run cables over sharp edges or burrs

Do:

- Make drip and service loops
- Use cable-tie on all cables to keep them secure
- Solder/crimp and insulate all wiring connections if extending or shortening the cables. Extending cables should be done with suitable crimp connectors or solder and heat shrink. Keep joints as high as possible to minimize possibility of water immersion.
- Leave room adjacent to connectors to ease plugging and unplugging of cables

**⚠ Warning:** Before starting the installation, be sure to turn electrical power off. If power is left on or turned on during the installation, fire, electrical shock, or other serious injury may occur. Be sure that the voltage of the power supply is compatible with the unit.

**⚠ Warning:** The positive supply wire (red) should always be connected to (+) DC with a fuse or a circuit breaker (closest available to fuse rating).

### Control devices

The system can be operated by:

- a supported remote controller connected via NMEA 2000
- touch monitors connected via serial interface (RS422) or USB
- keyboard and mouse/trackball connected via USB

For wiring details, refer to the port description in the next pages.

By default, a USB port is assigned by control the monitor connected to the same processor. See more details in *"USB ports"* on page 22.

### Monitors

Up to two monitors may be connected via the HDMI ports.

Monitors with DVI inputs only should use an HDMI-DVI adaptor.

→ **Note:** Brightness control are not supported over DVI.

Monitors must conform to the supported resolutions and refresh rates as defined in the Technical specification.

## Power

The unit is designed to be powered by a 12 or 24 V DC system.

It is protected against reverse polarity, under voltage and over voltage (for a limited duration).

A fuse or circuit breaker should be fitted to the positive supply. For recommended fuse rating, refer to "*Technical specifications*" on page 38.

### Power connector details



Unit socket (male)

Pin	Purpose
1	DC negative
2	External alarm
3	Power control
4	+12/24 V DC

### Power control connection

The yellow wire in the power cable can be used to control how the unit is turned on and off.

#### Power controlled by power key

The unit will turn on/off when the power key on the unit is pressed.

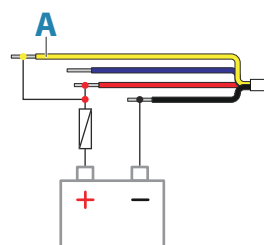
Leave the yellow power control wire disconnected and tape or heat-shrink the end to prevent shorting.

#### Power control by supply power

The unit will turn on/off without using the power key when power is applied/removed.

Connect the yellow wire to the red wire after the fuse.

→ **Note:** The unit cannot be powered down by power button, but can be put in to standby mode (the screen backlight turns off).

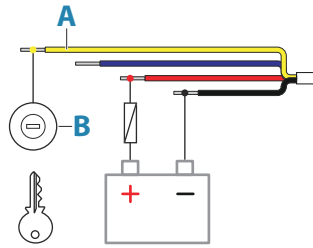


Key	Purpose	Color
A	Power control wire, connected to supply power	Yellow

### Power controlled by ignition

The unit will turn on once ignition is turned on to start engines.

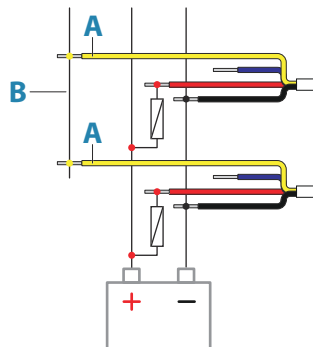
→ **Note:** Engine start batteries and house batteries should have a common ground connection.



Key	Purpose	Color
<b>A</b>	Power control wire	Yellow
<b>B</b>	Ignition switch	

### Power controlled by master slave bus

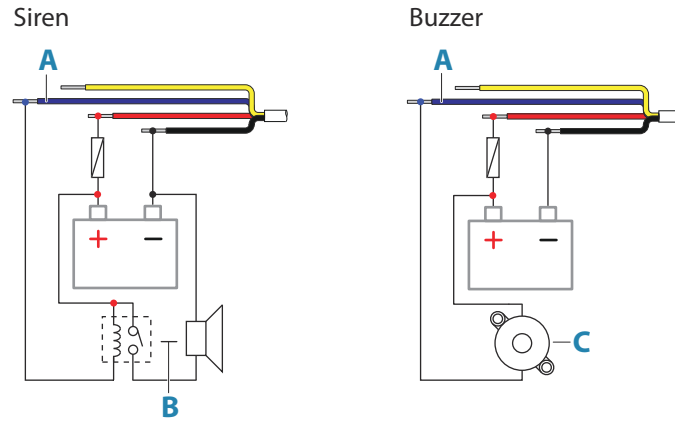
The yellow power control wire can either be an input that will turn on the unit when power is applied, or an output that turns on other devices when the unit is powered on. It can be configured at the installation stage to control the power state of displays and compatible devices. When commissioning the system, the unit can be set to be a power control slave or power control master.



Key	Purpose	Color
<b>A</b>	Power control wire	Yellow
<b>B</b>	Master slave bus	

If a unit is configured as power control master and turned on by the power key, it will output voltage on the power control bus. This will power on both other power master units and power slave units. If a unit is set to power control slave, it cannot be powered down using its own power key while a power control master unit is turned on. Pressing the power key will set the unit to standby. If all power control masters are off, power control slaves can be turned on using their own power key. This however will not turn on any other units connected to the power bus.

## External alarm



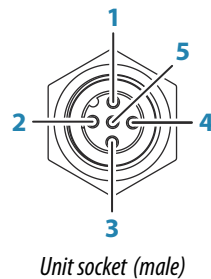
For sirens that draw more than 1 A, use a relay.

Key	Purpose	Color
<b>A</b>	External alarm output	Blue
<b>B</b>	Siren and relay	
<b>C</b>	Buzzer	

## NMEA 2000

The NMEA 2000 data port allows receiving and sharing of a multitude of data from various sources.

### Connector details



Pin	Purpose
<b>1</b>	Shield
<b>2</b>	NET-S (+12 V DC)
<b>3</b>	NET-C (DC negative)
<b>4</b>	NET-H
<b>5</b>	NET-L

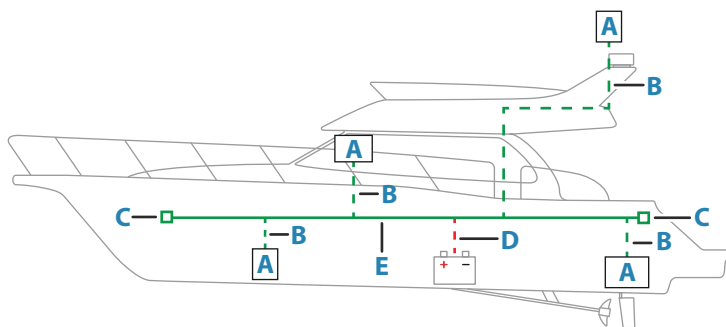
### Plan and install an NMEA 2000 network

An NMEA 2000 network consists of a powered backbone from which drop cables connect to NMEA 2000 devices. The backbone needs to run within 6 m (20 ft) of the locations of all products to be connected, typically in a bow to stern layout.

The following guidelines apply:

- The total length of the backbone should not exceed 100 meters (328 ft)

- A single drop cable has a maximum length of 6 meters (20 ft). The total length of all drop cables combined should not exceed 78 meters (256 ft)
- The backbone needs to have a terminator at each end of the backbone. The terminator can be a terminator plug or a unit with built-in terminator



- A** NMEA 2000 device
- B** Drop-cable
- C** Terminator
- D** Power supply
- E** Backbone

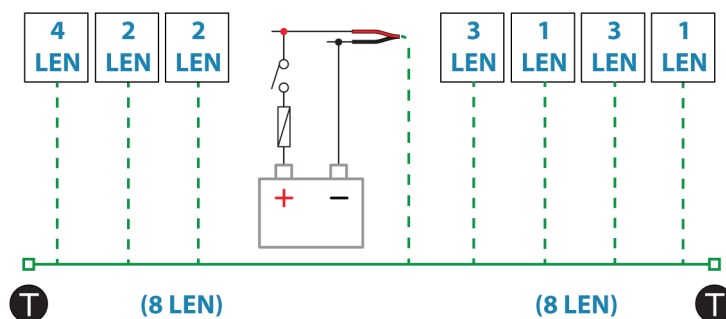
### Powering the network

The network requires its own 12 V DC power supply, protected by a 3 amp fuse.

For smaller systems: connect power at any location in the backbone.

For larger systems: connect power at a central point in the backbone to balance the voltage drop of the network. Make the installation such that the load/current draw on each side of the power node is equal.

→ **Note:** 1 LEN (Load Equivalency Number) equals 50 mA current draw.

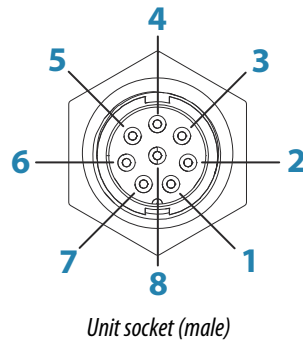


→ **Note:** Do not connect the NMEA 2000 power cable to the same terminals as the engine start batteries, autopilot computer, bow thruster or other high current devices.

### Serial port

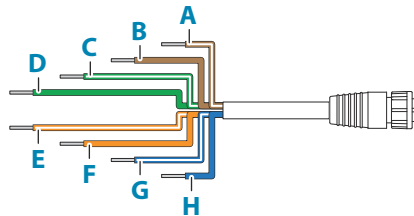
The serial port(s) is used for NMEA 0183 and touch screen control.

## Connector details



Pin	Purpose
1	NMEA 0183 Listener A (Rx_A)
2	NMEA 0183 Listener B (Rx_B)
3	NMEA 0183 Talker A (Tx_A)
4	NMEA 0183 Talker B (Tx_B)
5	RS422 Talker + (Tx+)
6	RS422 Talker - (Tx-)
7	RS422 Listener - (Rx-)
8	RS422 Listener + (Rx+)

## NMEA 0183 and Touch screen control, cable details



Key	Description	Color
A	NMEA 0183 Listener B (Rx_B)	Brown/white
B	NMEA 0183 Listener A (Rx_A)	Brown
C	NMEA 0183 Talker B (Tx_B)	Green/white
D	NMEA 0183 Talker A (Tx_A)	Green
E	RS422 Talker + (Tx+)	Orange/white
F	RS422 Talker - (Tx-)	Orange
G	RS422 Listener - (Rx-)	Blue/white
H	RS422 Listener + (Rx+)	Blue

### NMEA 0183

The units has two NMEA 0183 ports, which are connected via two discrete cables. Each cable is dedicated to one of the two internal processors.

→ **Note:** AIS data supplied via NMEA 0183 is not internally bridged, and must be connected to both NMEA 0183 ports if required on both screens. AIS data supplied via NMEA 2000 is available to both processors.

The port(s) uses the NMEA 0183 (serial balanced) standard, and can be configured in the software for different baud rates up to 38,400 baud.

### **Talkers and listeners**

Only one talker (output device) can be connected to a serial input (RX) on the unit, in accordance with the NMEA0183 protocol. However, an output port (TX) on the unit may be connected to up to three listener (receiver) devices, dependent on the hardware capabilities of the receiver.

### **Touch screen control**

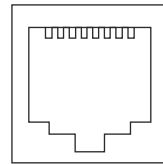
Touch monitors can be connected via the serial port (RS422).

## **Ethernet**

The Ethernet port(s) can be used for transfer of data and synchronization of user created data. It is recommended that each device in the system is connected to the Ethernet network.

No special setup is required for establishing an Ethernet network.

### **Ethernet connector details**



*Unit socket (female)*

The unit is equipped with standard RJ45 connector(s).

### **Ethernet adapter cables**

Units with a 5-pin yellow Ethernet connector will require an adapter cable to connect to this unit.

### **Ethernet expansion device**

Connection of network devices can be made via an Ethernet expansion device. Additional expansion devices can be added to provide the required number of ports.

## **USB port**

The USB port can be used to:

- connect a keyboard
- connect a mouse
- connect a storage device
- connect a card reader

→ **Note:** If you want to read chart cards using a USB card reader connected to the USB port, an MI10 USB card reader is required.

The USB devices should be standard PC compatible hardware.

→ **Note:** USB cable length should not exceed 5 m when using regular cables. Lengths over 5 m may be possible with the use of an active USB cable.

### **Configuring the USB port**

By default, a USB port is assigned by control the monitor connected to the same processor. See more details in "*USB ports*" on page 22.



## USB connector details



*Unit socket (female)*

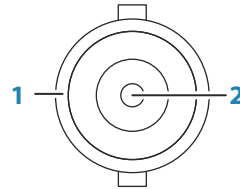
The unit is equipped with standard USB type-A connector(s).

## Video in

The unit can be connected to two composite video sources, and display video images on its display.

- **Note:** Camera cables are not supplied, and will need to be selected to suit termination - BNC at the unit, and typically BNC or RCA plug at the camera end.
- **Note:** The video images will not be shared with another unit via the network. It is only possible to view video on the unit connected to the video source.
- **Note:** Both NTSC and PAL formats are supported.

## Video in connector details



*Unit socket (female)*

Pin	Purpose
1	Ground
2	Signal

## Video input configuration

Configurations to video input are made in the video panel. Refer to the Operator Manual for more information.

## HDMI out

The HDMI port(s) is used for connecting monitor(s).

The connected monitor should support the resolution listed in the Technical specifications, or be able to scale.

- **Note:** Some HDMI TV displays may apply over-scan, which will in effect crop the image possibly causing loss of important content. Check the display manual for an option to disable over-scan or adjust scaling.

## HDMI connector details



*Unit socket (female)*

The unit is equipped with standard HDMI (Type A) connector(s).

## HDMI cable requirements

→ **Note:** The unit should be turned off prior to connecting or disconnecting an HDMI cable.

While the HDMI standard does not state maximum cable length, signal may be compromised on long runs. Only use Navico or other high quality HDMI certified cables. 3rd party cables should be tested before installation. On runs over 10 m it may be required to add an HDMI amplifier or use HDMI-CAT6 adaptors.

## Card reader

A memory card can be used for:

- Chart data
- Software updates
- Transfer of user data
- Logging user data
- System backup

→ **Note:** Do not download, transfer or copy files to a chart card. Doing so can damage chart information on the chart card.

# 4

## Software setup

### First time startup

When the unit is started for the first time, or after a reset, the unit displays a series of dialogs. Respond to the dialog prompts to make fundamental settings.

You can perform further setup and later change settings using the system settings dialogs.

### Software setup sequence

This setup sequence focus on the settings done during installation and setup of the system. For other settings refer to the Operator manual.

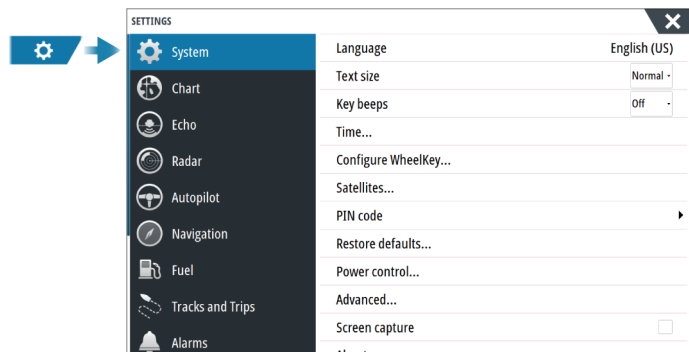
- 1 General settings** - refer to "*System settings*" on page 21.
  - Make general settings as desired
  - Configure the USB ports
  - Configure the power control
- 2 Advanced settings** - refer to "*Advanced*" on page 22.
  - Enable or disable features
  - Review the advanced setting options and make changes as desired
- 3 Source selection** - refer to "*Network settings*" on page 32.
  - Make sure that the proper external data sources have been selected
- 4 Feature setup**
  - Configure specific features as described later in this chapter

### The settings dialog

The software setup is done from the settings dialog.



### System settings



### Boat settings

Used to specify the physical attributes of the boat.

### Time

Configure time settings to suit vessel location, along with time and date formats.

## PIN code

Sets a PIN code to prevent unauthorized access to your system's settings.

**Note:** Record the PIN code and store it in a safe place.

When you establish password protection, the PIN code must be entered when any of the following are selected. After the correct PIN code is entered, all of them can be accessed without re-entering the PIN code.

- Settings, activated from the home page or system controls dialog
- Alarms, activated from the toolbar
- Storage, activated from the toolbar
- Store, activated from the toolbar

## Power control setup

Determines unit response to signal applied to the power control wire. Refer to "*Power control connection*" on page 13.

This setting is only applicable if the yellow wire is used for power control.

- Set to slave if the yellow wire is connected to ignition or to a stand-alone switch
- Set to master to make this device turn other devices connected to the master slave bus on and off

When a master unit is turned on or off, all units connected to the same master slave bus turns on or off.

While a master unit is on, a slave unit cannot be turned off.

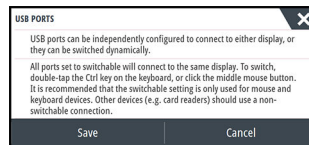
If no master unit is turned on, slave units can be turned on or off individually.

## USB ports

By default, one USB port is assigned to each monitor.

If a mouse or a keyboard is used to only control one of the displays, set the USB port used to be permanently assigned to one display.

If a mouse or a keyboard is used to control both monitors, the USB port used need to be set up to be switchable between the monitors.

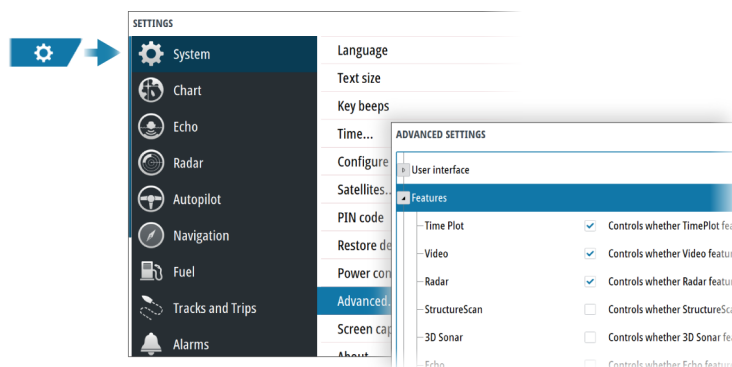


→ **Note:** A USB port should be set to switchable only when used for a mouse or a keyboard.

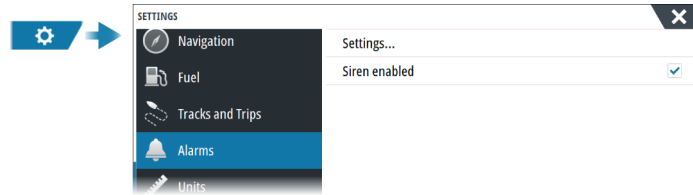
## Advanced

### Enabling or disabling features

Use the feature option to enable or disable features that are not automatically enabled or disabled by the system.



## Alarms



### Settings

List of all available alarm options in the system, with current settings. From this list you can activate, deactivate and change alarm limits.

### Siren enable

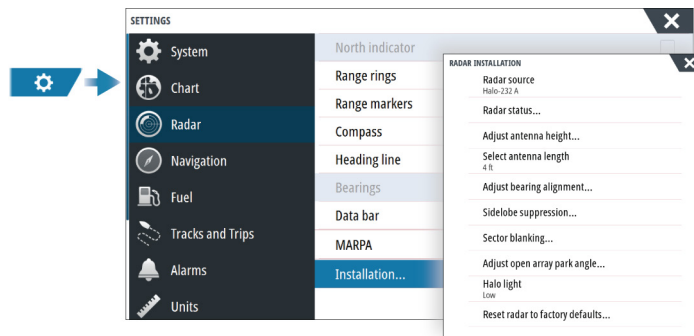
The Siren enabled option must be set in order for the unit to activate the buzzer when an alarm condition arises.

Its setting also determines the operation of the external alarm output.

## Radar installation

The radar system requires radar sensor specific settings in order to adjust for a number of variables found in different installations.

→ **Note:** The installation settings available depends on the radar sensor.



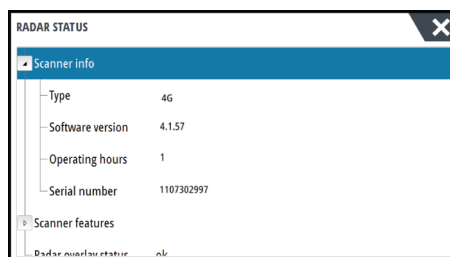
### Radar source

In a system with more than one radar sensor, the device to configure is selected from this menu.

→ **Note:** Radars that support dual radar mode are represented twice in the source list, with an A and B suffix.

### Radar status

Displays scanner information and scanner features, primarily used for information and to assist with fault finding.



## Adjust antenna height

Set the radar scanner height relative to the water surface. The Radar uses this value to calculate the correct STC settings.

## Select antenna length

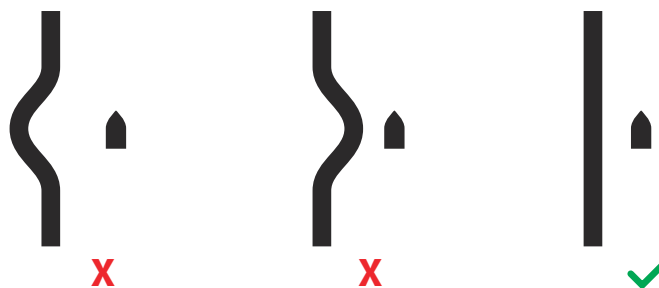
Select the proper antenna length.

## Adjust range offset

The radar sweep should commence at your vessel (a radar range of zero). You may need to adjust the radar range offset to achieve this. If this is set incorrectly, a large dark circle in the center of the sweep might occur. You might notice straight objects such as straight sea walls or piers having curves or an indentation. Objects close to your vessel may appear pulled in or pushed out.

Adjust the range offset as below when the vessel is about 45 to 90 m (50 to 100 yards) from a straight-walled jetty or similar feature that produces a straight line echo on the display.

- 1 Point the vessel towards the jetty
- 2 Adjust the range offset to make the jetty echo appear as a straight line on the display



## Adjust bearing alignment

This option is used to align the heading marker on the screen with the center line of the vessel. This will compensate for any slight misalignment of the scanner during installation.

Misalignment that is not corrected for will compromise target tracking and can result in dangerous misinterpretation of potential navigation hazards.

Any inaccuracy will be evident when using MARPA or chart overlay.

- 1 Point the vessel towards a stationary isolated object, or towards a far range AIS where the AIS icon matches the radar echo
- 2 Adjust the coarse and fine bearing alignment so that the heading line touches the end of the selected object

## Sidelobe suppression

Occasionally false target returns can occur adjacent to strong target returns such as large ships or container ports. This occurs because not all of the transmitted radar energy can be focused into a single beam by the radar antenna, a small amount of energy is transmitted in other directions. This energy is referred to as sidelobe energy and occurs in all radar systems. The returns caused by sidelobes tend to appear as arcs.

→ **Note:** This control should only be adjusted by experienced radar users. Target loss in harbor environments may occur if this control is not adjusted correctly.

When the radar is mounted where there are metallic objects near the radar, sidelobe energy increases because the beam focus is degraded. The increased sidelobe returns can be eliminated using the sidelobe suppression control.

By default, this control is set to auto and normally should not need to be adjusted. However, if there is significant metallic clutter around the radar, sidelobe suppression may need to be increased.

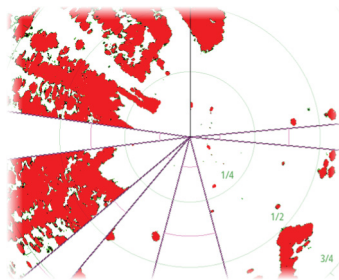
To adjust the sidelobe suppression value:

1. Set radar range to between 1/2 nm to 1 nm and the sidelobe suppression to auto
2. Take the vessel to a location where sidelobe returns are likely to be seen. Typically, this would be near a large ship, container port, or metal bridge.
3. Traverse the area until the strongest sidelobe returns are seen.
4. Change auto sidelobe suppression to OFF, then adjust the sidelobe suppression control just enough to eliminate the sidelobe returns. You may need to monitor 5-10 radar sweeps to be sure they have been eliminated.
5. Traverse the area again and readjust if sidelobe returns still occur.

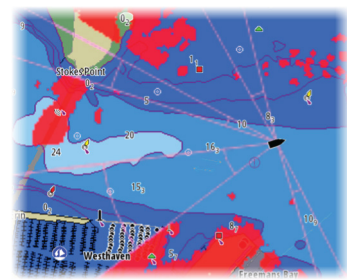
### Sector blanking

Radar installed in close proximity to a mast or structure could cause unwanted reflections or interference to appear on the radar image. Use the sector blanking feature to stop the radar from transmitting on up to four sectors in the image.

- **Note:** Sectors are setup relative to the heading line of the radar. The bearing of the sector is measured from the center line of the sector.
- **Note:** Sector blanking should be applied very carefully to avoid reducing the radar's usefulness in identifying valid and potentially dangerous targets.



Main radar PPI



Radar overlay on a chart

### Adjust open array park angle

The park angle is the final resting position of the antenna relative to the heading line of the radar when the radar is set to standby. The antenna will stop rotating at the desired offset.

### Adjust local interference reject

Interference from some onboard sources can interfere with the Broadband radar. One symptom of this could be a large target on the screen that remains in the same relative bearing even if the vessel changes direction.

### Halo light

Controls the levels of the Halo Radar blue accent lighting. The accent lighting can only be adjusted when the radar is in standby mode.

- **Note:** The blue accent pedestal lighting might not be approved for use in your boating location. Check your local boating regulations before turning the blue accent lights ON.

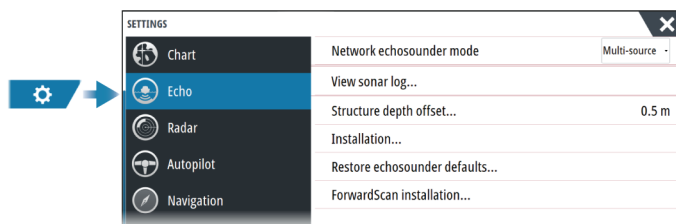
### Reset radar to factory defaults

Clears all user and installer settings applied to the selected radar source, and restores factory settings.

- **Note:** Use this option with caution. Take note of current settings first, especially those set by the operator if radar has already been in active service.

## Echosounder settings

A compatible echosounder module (or another unit which has built-in sonar) shared over the Ethernet network is required to view echosounder images on the unit.



### Network echosounder mode

The network echosounder mode setting selects whether only one or multiple echosounder sources can be selected at the same time.

→ **Note:** Changing the mode requires that all connected sources are restarted.

### Overlay DownScan

When a DownScan capable transducer is connected to your system, you can overlay DownScan images on the regular Echosounder image.

When overlay DownScan is activated, the Echosounder panel menu expands to include basic DownScan options.

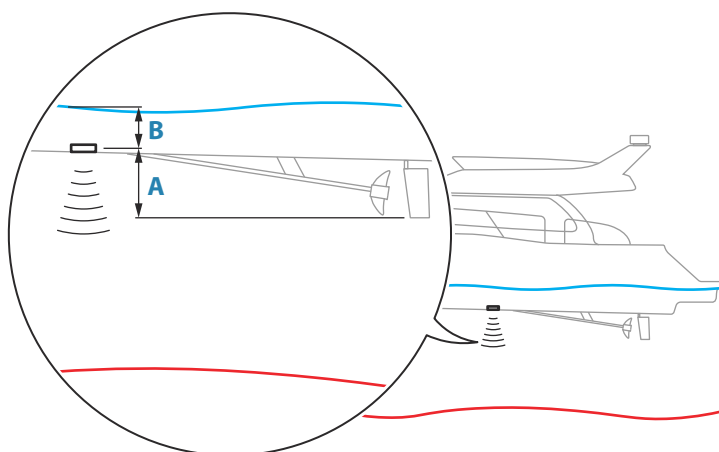
### View sonar log

Used to view recordings. The log file is displayed as a paused image, and you control the scrolling and display from the menu.

You can use the cursor on the image, measure distance, and set view options as on a live image. If more than one channel was recorded in the selected log file, you can select which channel to display.

### Structure depth offset

All transducers measure water depth from the transducer to the bottom. As a result, water depth readings do not account for the distance from the transducer to the lowest point of the boat in the water or from the transducer to the water surface.

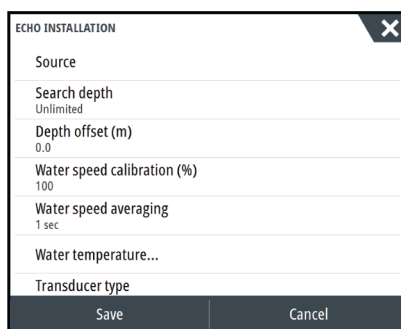


- To show the depth from the lowest point of the vessel to the bottom, set the offset equal to the vertical distance between the transducer and the lowest part of the vessel, **A** (negative value).
- To show the depth from the water surface to the bottom, set the offset equal to the vertical distance between the transducer and the water surface, **B** (positive value)
- For depth below transducer, set the offset to 0.



## Installation

Use this dialog to setup and configure available sources.



Field	Value
Source	
Search depth	Unlimited
Depth offset (m)	0.0
Water speed calibration (%)	100
Water speed averaging	1 sec
Water temperature...	
Transducer type	

### Source

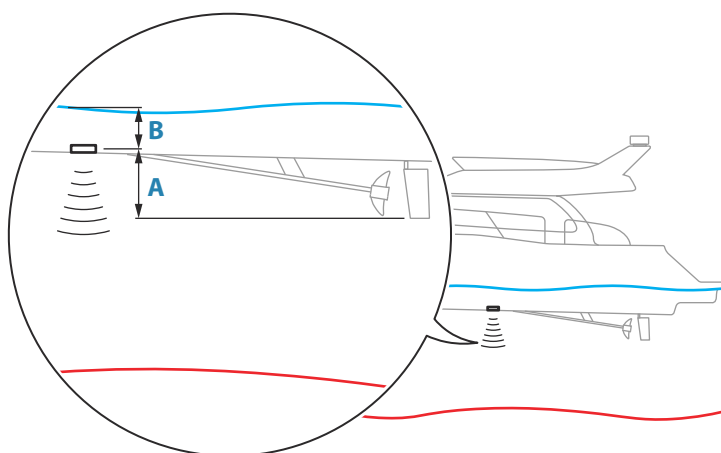
Select this option to display a list of sources available for setup. The settings you make in the rest of the dialog pertain to the source selected.

### Search depth

Noise may cause the echosounder to search for unrealistic depths. By setting the search depth manually the system displays echoes received from objects within the set depth range.

### Depth offset

All transducers measure water depth from the transducer to the bottom. As a result, water depth readings do not account for the distance from the transducer to the lowest point of the boat in the water or from the transducer to the water surface.



- To show the depth from the lowest point of the vessel to the bottom, set the offset equal to the vertical distance between the transducer and the lowest part of the vessel, **A** (negative value).
- To show the depth from the water surface to the bottom, set the offset equal to the vertical distance between the transducer and the water surface, **B** (positive value)
- For depth below transducer, set the offset to 0.

### Water speed calibration

Water speed calibration is used to adjust the speed value from the paddle wheel to match the actual boat speed through the water. Actual speed can be determined from GPS speed over ground (SOG) or by timing the boat over a known distance. Water speed calibration should be performed in calm conditions, with minimal wind and current movement.

Increase this value above 100 % if the paddle wheel is under reading, and decrease this value if it is over reading. For example, if the average water speed reads 8.5 knots (9.8 MPH) and SOG records 10 knots (11.5 MPH) the calibration value needs to be increased to 117 %. To

calculate the adjustment, divide the SOG by the paddlewheel speed, and multiply the product by 100.

Calibration range: 50-200 %. Default is 100 %.

### **Water speed averaging**

Averages water speed by measuring your speed at a selected interval of time. Water speed intervals range from one to thirty seconds. For example if you select five seconds, your displayed water speed will be based on averaging over 5 seconds of sampling.

Calibration range: 1-30 seconds. Default is 1 second.

### **Water temperature calibration**

Temperature calibration is used to adjust the water temperature value from the sonar transducer. It may be required to correct for localized influences to the measured temperature.

Calibration range: -9.9° - +9.9°. Default is 0°.

→ **Note:** Water temperature calibration only appears if the transducer is temperature capable.

### **Transducer type**

→ **Note:** The transducer type is automatically set for transducers that support Transducer ID (XID) and is not user selectable.

Transducer type is used for selecting the transducer model connected to the sonar module. The transducer selected will determine what frequencies the user can select during sonar operation. In some transducers with built-in temperature sensors, the temperature reading may be inaccurate or not available at all if the wrong transducer is selected. Transducer temperature sensors are one of two impedances - 5k or 10k. Where both options are given for the same model transducer, refer to paperwork supplied with transducer to determine impedance.

### **Restore echosounder defaults**

Restore echosounder settings to the factory supplied defaults.

### **Use depth and temp data from**

Selects from which source the depth and temperature data is shared on the NMEA 2000 network.

### **ForwardScan installation**

Available when the ForwardScan feature is connected.

For setup information, refer to the Operator Manual.

### **LiveSight installation**

Available when a LiveSight transducer is connected.

For setup information, refer to the documentation following the LiveSight transducer.

## **Autopilot settings**

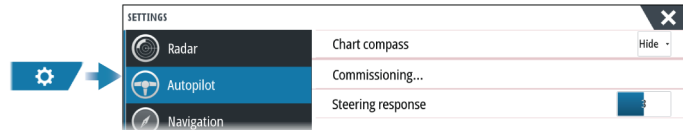
The Autopilot settings dialog depends on which autopilot computer that is connected to the system. If more than one autopilot is connected, the Autopilot settings dialog shows option for the active autopilot.

The autopilot settings can be split between settings done by the user, and settings done during installation and commissioning of the autopilot system.

- User settings can be changed for various operational conditions or user preferences.
- Installation settings are defined during commissioning of the autopilot system. No changes should later be done to these settings.

The following sections describe the installation settings per autopilot computer. For user settings, refer to the Operator manual.

## NAC-1 specific installation settings



### Commissioning

Used to calibrate your boat's steering (cable steer or hydraulic steering) with the NAC-1.

→ **Note:** The autopilot must be commissioned prior to first use and any time after autopilot default settings have been restored.

#### Cable steer calibration

→ **Note:** The rudder source must be set to rudder feedback to be able to run this calibration

Start the calibration process by selecting the rudder feedback calibration option, and follow the onscreen instructions.

→ **Note:** When centering the motor during the calibration process, ensure that the motor is centered visually when the dialog shows 0 value. If not, center the motor visually before pressing OK to align the physical position with the dialog value.

When the calibration process is completed, select the rudder test option to confirm the calibration.

If the calibration does not pass the rudder test:

- confirm that motor is moving
- confirm that the rudder feedback reading moves according to motor rotation
- check the NAC-1 drive cable
- confirm that the motor can be manually moved smoothly in each direction
- check for other mechanical issues
- check wiring connections
- repeat the rudder calibration.

#### Hydraulic system calibration

Virtual rudder feedback (VRF) calibration is used for vessels with hydraulic steering when no rudder feedback is available.

→ **Note:** The rudder source must be set to VRF to be able to run this calibration.

Start the calibration process by selecting the VRF calibration option, and follow the onscreen instructions.

→ **Note:** When the autopilot attempts to turn the motor during the calibration process, ensure that the motor movement is noticeable and that the motor is turning in the correct direction before selecting **Yes** on the dialog. When **No** is selected, the NAC-1 reverses direction and increases power the next time it turns the motor during the calibration process.

→ **Note:** You may have to select **No** more than once to ensure the pump provides enough power to turn the motor at high boat speed.

### Steering response

Used to increase or decrease the steering sensitivity. A low response level reduces the rudder activity and provides a more loose steering. A high response level increases the rudder activity and provides more tight steering. A too high response level will cause the boat to make S movements.

## NAC-2/NAC-3 specific installation settings

For setup and commissioning of the NAC-2 or NAC-3, refer to the commissioning manual included with the autopilot computer.

## AC70/AC80 Specific installation settings

The AC70/AC80 computers do not have any specific installation settings available in the MFD.

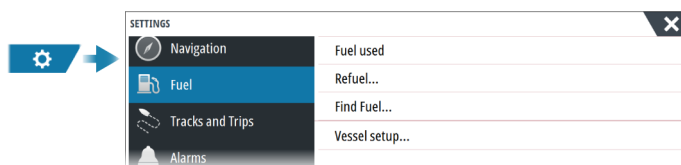
→ **Note:** The MFD cannot be used to configure or commission an AP70/AP80 system. For more information, refer to the documentation included with the autopilot system.

## Fuel settings

The fuel utility monitors a vessel's fuel consumption. This information is totaled to indicate trip and seasonal fuel usage, and is used to calculate fuel economy for display on instrument pages and the data bar.

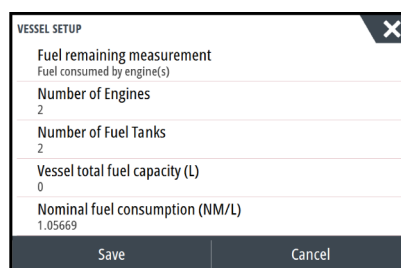
To use the utility, a Navico Fuel Flow sensor, or a NMEA 2000 engine adaptor cable/gateway with Navico Fuel Data Storage device must be fitted to the vessel. The Navico Fuel Flow sensor, does not require the use of a separate Fuel Storage device. Refer to the engine manufacturer or dealer for information on whether or not your engine provides a data output, and what adaptor is available to connect to NMEA 2000.

Once the physical connection is made, ensure source selection is completed. Multiple engine installations using Fuel Flow sensors, or Fuel Data Storage devices, require setup of related engine location in the Device list. For general source selection information, refer to "*Network settings*" on page 32.



## Vessel setup

The Vessel setup dialog must be used to select the number of engines, the number of tanks and vessel's total fuel capacity across all tanks.



### Fuel remaining measurement

The Fuel remaining measurement can be determined from fuel used by engine(s), or fuel level from tank sensors. Nominal fuel consumption is required to set the scale on the fuel economy gauge. This value should be determined from experience, over time. Alternatively the boat builder or designer may be able to give an approximate value to use.

→ **Note:** Fuel remaining measurement taken from level sensors while underway can get inaccurate readings due to vessel movement.

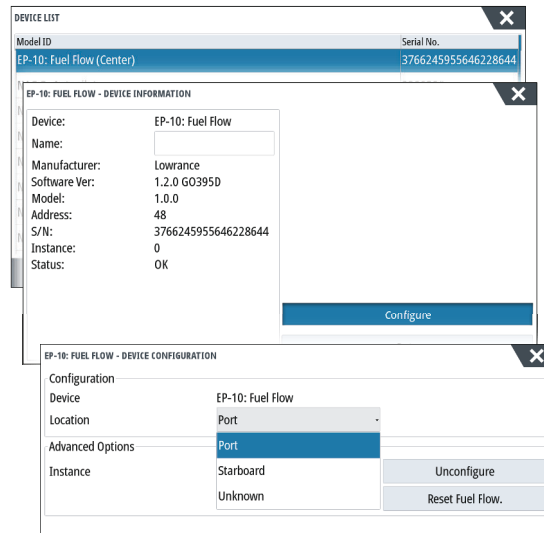
→ **Note:** Nominal fuel consumption setting should be determined taking into account typical vessel loads. That is, filled fuel and water tanks, stowed tender, supplies, etc.

### Fuel flow configuration

After the number of engines is set, it is required to set which fuel flow sensor is connected to which engine. Under Device list on the Network page, view the Device Configuration dialog for each sensor, and set the Location to match the engine the device is connected to.

**Unconfigure** - defaults the device which clears all user settings.

**Reset Fuel Flow** - restores only the Fuel K-Value setting, if set in Calibrate. Only Navico devices can be reset.



## Calibrate

Calibration may be required to accurately match measured flow with actual fuel flow. Access calibration from the Refuel dialog. Calibration is only possible on Navico's Fuel Flow sensor.

1. Start with a full tank and run the engine as it would normally be operated.
  2. After at least several liters (a few gallons) have been used, the tank should be fully refilled, and the Set to full option selected.
  3. Select the Calibrate option.
  4. Set the actual amount used based on amount of fuel added to the tank.
  5. Select OK to save settings. The Fuel K-Value should now show a new value.
- **Note:** To calibrate multiple engines repeat the steps above, one engine at a time. Alternatively, run all engines simultaneously, and divide the Actual amount used by the number of engines. This assumes reasonably even fuel consumption on all engines.
- **Note:** The Calibrate option is only available when Set to full is selected, and a Fuel Flow is connected and set up as a source.
- **Note:** A maximum of 8 engines is supported using Fuel Flow sensors.

## Fuel Level

With the use of a Navico Fluid Level device connected to a suitable tank level sensor, it is possible to measure the amount of fuel remaining in any equipped tank. The number of tanks must be set in Vessel Setup dialog, initiated from the Fuel setting options page, to allow discrete tank assignment of the Fluid Level devices.

Select Device list on the Network page, and view the Device Configuration dialog for each sensor, and set the Tank location, Fluid type, and Tank size.

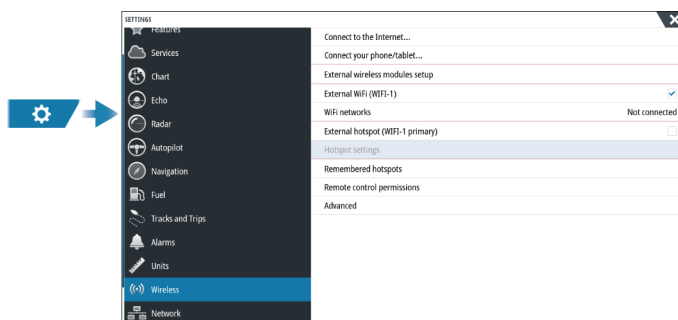
For setting up the Instrument bar or a gauge on the Instrument page with Fluid Level device data, refer to the Operator Manual.

- **Note:** A maximum of 5 tanks is supported using Fluid Level devices.
- **Note:** Tank data that is output by a compatible engine gateway can also be displayed, however tank configuration for such a data source is not possible from this unit.

## Wireless settings

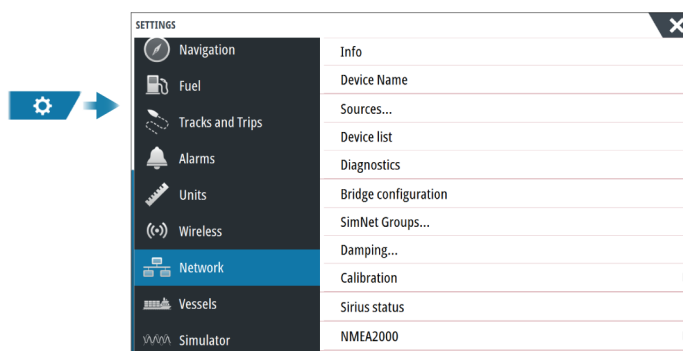
Provides configuration and setup options for the wireless functionality.

This unit does not have built-in WiFi. To connect to the internet or to use the Link app you must have a compatible external WiFi module connected to the same Ethernet network as this unit. The following image shows options available when the unit is connected to a compatible external WiFi module.



For further details about wireless setup and connectivity, refer to the Operator Manual.

## Network settings



### Device name

Assigning a name is useful in systems using more than one device of the same type and size.

### Sources

Data sources provide live data to the system.

When a device is connected to more than one source providing the same data, the user can choose the preferred source. Before commencing with source selection make sure all external devices and networks are connected and turned on.

### Auto Select

The Auto Select option looks for all sources connected to the device. If more than one source is available for each data type, selection is made from an internal priority list. This option is suitable for the majority of installations.

### Manual source selection

Manual selection is generally only required where there is more than one source for the same data, and the automatically selected source is not the one desired.

### Group source selection

The unit can use the same data sources that all other products on the network use, or alternatively use a data source independently from other units.

If the unit is part of a source group, all source selection changes will affect all units belonging to the same group.

→ **Note:** In order to enable group selection, the unit must be set to the Simrad group.

Devices with no selected group can use different sources than the rest of the network devices.

### Advanced source selection

This allows the most flexible and precise manual control over which devices provide data.

Occasionally auto select might not assign the desired source, which can be corrected using the advanced source selection.

## Device list

Selecting a device in this list will bring up additional details and options for the device.

All devices allow allocation of an instance number in the configure option. Set unique instance numbers on any identical devices on the network to allow the unit to distinguish between them. The data option shows all data being output by the device.

→ **Note:** In most cases, setting the instance number on a 3rd party product is not possible.

## Display assignment

Display assignment must be performed to enable the Home button on MO series monitors. It also ensures that when pressed, the home page is opened on the correct monitor.

This option must be set separately on both monitors connected.

→ **Note:** This feature is dependant on both the MPU and the MO series monitor being connected to the NMEA 2000 network.

## Diagnostics

Provides information useful for identifying an issue with the network.

## NMEA 2000

Provides information on NMEA 2000-bus activity.

→ **Note:** The following information might not always indicate an issue that can be simply resolved with minor adjustment to network layout or connected devices and their activity on the network. However, Rx and Tx errors are most likely indicating issues with the physical network, which can be resolved by correcting termination, reducing backbone or drop lengths, or reducing the number of network nodes (devices).

## UDB

Provides information on Ethernet activity.

## SimNet groups

This function is used to control parameter settings, either globally or in groups of units. The function is used on larger vessels where several units are connected to the NMEA 2000 network. By assigning several units to the same group, a parameter update on one unit will have the same effect on the rest of the group members.

If any of the settings require discrete control, set the group to None.

## Damping

If data appears erratic or too sensitive, damping may be applied to make the information appear more stable. With damping set to off, the data is presented in raw form with no damping applied.

## Calibration

An offset (positive or negative) can be applied to correct data inaccuracies from NMEA 2000 sources.

→ **Note:** Any calibrations made here will only be applied locally to this unit. Other devices on the network will not have these offsets applied.

## NMEA 2000 setup

### Receive waypoint

Select this option to allow another device capable of creating and exporting waypoints via NMEA 2000 to transfer directly to this unit.

### Send waypoint

Select this option to allow this unit to send waypoints to another device via NMEA 2000.

→ **Note:** The system can only transmit or receive one waypoint at a time on creation of that waypoint. For bulk import or export of waypoints see the operator manual.

### **NMEA 0183 setup**

The NMEA 0183 port(s) must be set to suit the speed of connected devices, and can be configured to output only the sentences required by listening devices.

#### **Receive waypoint**

Select this option to allow a device capable of creating and exporting waypoints via NMEA 0183 to transfer directly to this unit.

#### **Baud rate**

This should be set to correspond with devices connected to the NMEA 0183 input and output. The input and output (Tx, Rx) use the same baud rate setting.

→ **Note:** AIS transponders typically operate at NMEA 0183-HS (high speed), and will require the baud rate to be set to 38,400.

#### **Serial output**

Selection determines whether the data is output via Tx lines, and will enable editing of the output sentences list.

#### **Serial output sentences**

This list allows control over which sentences that are transmitted to other devices from the NMEA 0183 port. Due to the limited bandwidth of NMEA 0183 it is desirable to only enable the data that is required. The less sentences that are selected, the higher the output rate of the enabled sentences.

#### **Ethernet/WiFi**

The NMEA 0183 data stream is output and made available to tablet devices and PCs, via WiFi or Ethernet connection. The dialogue provides IP and port data typically required for configuring the application on the third party device.

→ **Note:** Other MFDs cannot decode this information back to NMEA 0183, to use the data as a source. To share data a physical NMEA 2000 or NMEA 0183 connection is still required.



# 5

## 3rd party support

### C-Zone

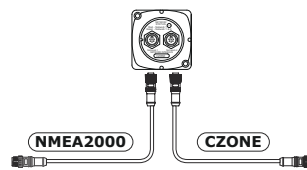
#### CZone connection to NMEA 2000

When interfacing to CZone network it is recommended to use a BEP Network interface bridge to join the two network backbones together.

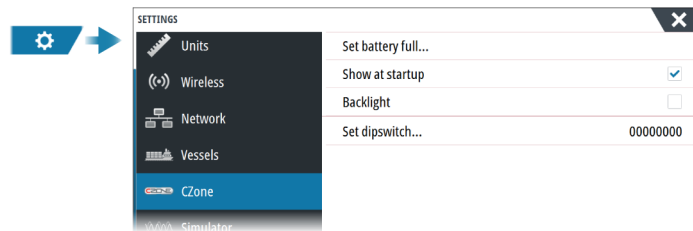
The CZone / NMEA 2000 Network interface bridge isolates the power of the two networks, but allows data to be freely shared between both sides.

The Interface Bridge can also be used for expansion of the NMEA 2000 network, when the maximum node limit (node = any device connected to network) for the network has been reached or the maximum cable length of 150 m will be exceeded. Once an Interface Bridge has been fitted, a further 40 nodes and additional cable length can be added.

The Network Interface is available from your BEP dealer.



#### CZone setup



In order to communicate with the CZone modules connected to the network, the unit must be assigned a unique CZone Display Dipswitch setting.

The functionality of the CZone system is determined by the CZone Config File which is stored on all CZone modules and the NSO evo3S MPU. The file is created using the CZone Configuration Tool, a specialized PC application available from BEP Marine Ltd, and associated CZone distributors.

For more information, refer to the documentation provided with your CZone system.

#### Assigning the dipswitch setting

Every product capable of controlling and viewing CZone devices must be assigned a virtual dipswitch setting. This setting is unique for each device. Typically it is set after the configuration file already exists on the CZone system, but it may also be set in advance. To do so, access the CZone menu on the Settings page.

When the configuration is already available on the network, it will immediately commence uploading to the NSO evo3S MPU once the dipswitch is set. Allow this to complete, without interruption.

#### Setting CZone to display at startup

With this option selected, the CZone control page is shown first, every time the NSO evo3S MPU is powered up.

#### Backlight

Enabling this causes the NSO evo3S MPU to synchronize its backlight setting with that of any CZone Display Interfaces set up to share backlight settings.

→ **Note:** CZone Config also needs to have the NSO evo3S MPU set as a controller.

## Naviop

If this device is on the same NMEA 2000 network as a Naviop Loop system, this device can be used to operate the Naviop Loop system.

For details, refer to the documentation following the Naviop system.

## Mercury

If the unit is on the same NMEA 2000 network as a compatible Mercury Marine VesselView product or VesselView Link, specific features are automatically unlocked on the unit. When the features are enabled, the display may prompt the user for some basic configuration information. Refer to the VesselView® manual or engine supplier for further information.

## Suzuki Marine

If this device is on the same NMEA 2000 network as a compatible Suzuki product or a compatible gateway, a dedicated Suzuki instrument panel is unlocked and automatically enabled. Data source selection is done the same way as for any regular NMEA 2000 sources.

## Yamaha

If a compatible Yamaha gateway is connected to the NMEA 2000 network, a Yamaha engine icon is added to the Home page.

For more information about configuration information, the Yamaha panel and the data displayed, and Troll control, refer to the Yamaha manual or the engine supplier.

## Evinrude

If an Evinrude engine control head is available on the NMEA 2000 network, the Evinrude engines can be monitored and controlled from the unit. When the feature is available, an Evinrude icon is added to the home page.

A maximum of two control heads and four engines is supported.

For more information, refer to the engine manual or engine supplier.

## Power-Pole

### Power-Pole Charge module

This device can interface with the Power-Pole Charge module via the C-Monster gateway. Only one gateway can work on the NMEA 2000 network at a time.

When valid data is received from the gateway, the Charge button is added to the control bar.

For more information about the battery charge functionality, refer to the Operator manual.

For installation, wiring and setup information, refer to the Power-Pole documentation supplied with the Charge module.

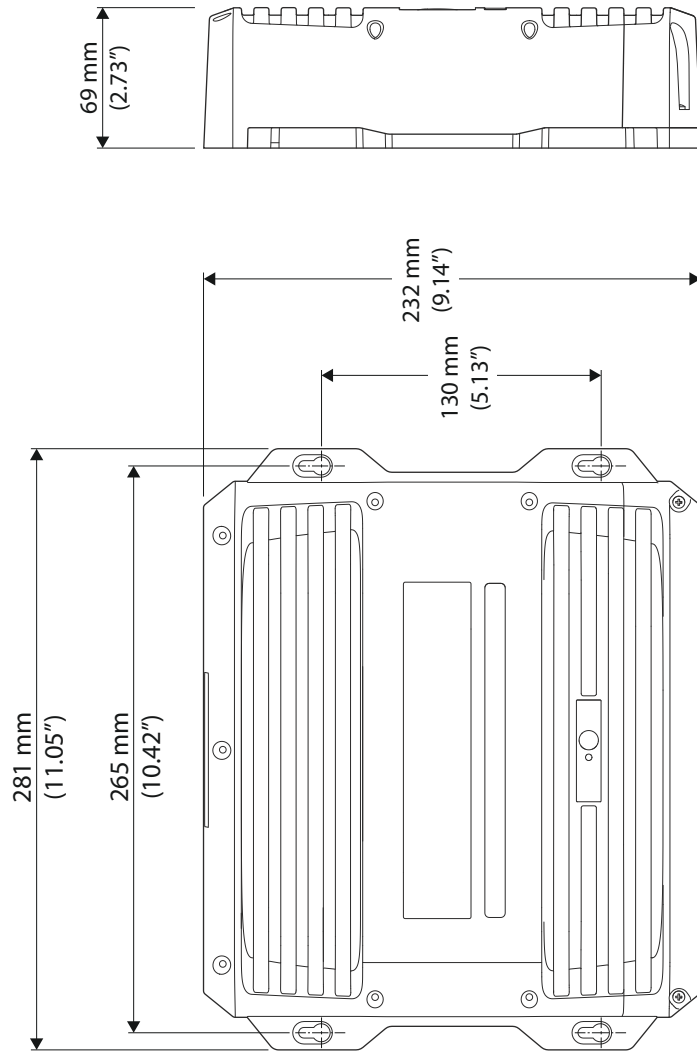
## FLIR camera setup

Compatible FLIR cameras are plug and play when used in conjunction with a device acting as a DHCP host.

# 6

## Dimensional drawings

### NSO-evo3S MPU



# 7

## Technical specifications

### NSO evo3S MPU

<b>Electrical</b>	
<b>Supply voltage</b>	9 - 31.2 V DC
<b>Power consumption - Max</b>	45 W
<b>Power consumption - OFF</b>	1 W
<b>Recommended fuse rating</b>	3 Amp
<b>Low power standby mode</b>	Yes
<b>Protection</b>	Reverse polarity and temporary over-voltage to 36 V
<b>Alarm output current</b>	1 Amp
<b>Processors</b>	iMX8 Quad Max (x2)
<b>Environmental</b>	
<b>Operating temperature range</b>	-15°C to +55°C (5°F to 131°F)
<b>Storage temperature</b>	-20°C to +60°C (4°F to 140°F)
<b>Waterproof rating</b>	IPX2
<b>Interface/Connectivity</b>	
<b>Ethernet</b>	3 ports (1 & 2 are PoE (RJ45 socket))
<b>USB</b>	2 ports (USB-A)
<b>NMEA 2000</b>	1 port (Micro-C male, 1 LEN)
<b>NMEA 0183</b>	2 ports. Baud rate: 4800, 9600, 19200, & 38400 (via proprietary cable)
<b>RS422</b>	2 ports. Baud rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
<b>Video input</b>	2 ports (BNC female. NTCS or PAL format)
<b>HDMI output</b>	2 ports (type A, 60 Hz nominal) <ul style="list-style-type: none"><li>• 800x600 (SVGA 4:3)</li><li>• 1024x768 (XGA 4:3)</li><li>• 1280x720 (HD 16:9)</li><li>• 1366x768 (WXGA)</li><li>• 1920x1080 (Full HD 16:9)</li><li>• 1920x1200 (WUXGA 16:10)</li><li>• 1280x800 (16:10)</li><li>• 1280x1024 (SXGA 5:4)</li></ul>
<b>Data card reader</b>	1 card slot (32 GB, SD card socket)
<b>Physical</b>	
<b>Material</b>	ABS plastic
<b>Dimensions</b>	Refer to "Dimensional drawings" on page 37
<b>Weight</b>	1.0 kg (2.2 lbs)
<b>Compass Safe Distance - Metric, imperial</b>	50 cm (20")

# 8

## Supported data

---

### NMEA 2000 compliant PGN List

#### NMEA 2000 PGN (receive)

59392	ISO Acknowledgement
59904	ISO Request
60160	ISO Transport Protocol, Data Transfer
60416	ISO Transport Protocol, Connection M.
65240	ISO Commanded Address
60928	ISO Address Claim
126208	ISO Command Group Function
126992	System Time
126996	Product Info
126998	Configuration Information
127237	Heading/Track Control
127245	Rudder
127250	Vessel Heading
127251	Rate of Turn
127252	Heave
127257	Attitude
127258	Magnetic Variation
127488	Engine Parameters, Rapid Update
127489	Engine Parameters, Dynamic
127493	Transmission Parameters, Dynamic
127500	Load Controller Connection State / Control
127501	Binary Status Report
127503	AC input status
127504	AC Output Status
127505	Fluid Level
127506	DC Detailed Status
127507	Charger Status
127508	Battery Status
127509	Inverter Status
128259	Speed, Water referenced
128267	Water Depth
128275	Distance Log
129025	Position, Rapid Update
129026	COG & SOG, Rapid Update
129029	GNSS Position Data
129033	Time & Date
129038	AIS Class A Position Report
129039	AIS Class B Position Report
129040	AIS Class B Extended Position Report
129041	AIS aids to Navigation

129283	Cross Track Error
129284	Navigation Data
129539	GNSS DOPs
129540	AIS Class B Extended Position Report
129545	GNSS RAIM Output
129549	DGNSS Corrections
129551	GNSS Differential Correction Receiver Signal
129793	AIS UTC and Date Report
129794	AIS aids to Navigation
129798	AIS SAR Aircraft Position Report
129801	Cross Track Error
129802	AIS Safety Related Broadcast Message
129283	Cross Track Error
129284	Navigation Data
129539	GNSS DOPs
129540	GNSS Sats in View
129794	AIS Class A Static and Voyage Related Data
129801	AIS Addressed Safety Related Message
129802	AIS Safety Related Broadcast Message
129808	DSC Call Information
129809	AIS Class B "CS" Static Data Report, Part A
129810	AIS Class B "CS" Static Data Report, Part B
130060	Label
130074	Route and WP Service - WP List - WP Name & Position
130306	Wind Data
130310	Environmental Parameters
130311	Environmental Parameters
130312	Temperature
130313	Humidity
130314	Actual Pressure
130316	Temperature, Extended Range
130569	Entertainment - Current File and Status
130570	Entertainment - Library Data File
130571	Entertainment - Library Data Group
130572	Entertainment - Library Data Search
130573	Entertainment - Supported Source Data
130574	Entertainment - Supported Zone Data
130576	Small Craft Status
130577	Direction Data
130578	Vessel Speed Components
130579	Entertainment - System Configuration Status
130580	Entertainment - System Configuration Status
130581	Entertainment - Zone Configuration Status
130582	Entertainment - Zone Volume Status
130583	Entertainment - Available Audio EQ Presets
130584	Entertainment - Bluetooth Devices

**NMEA 2000 PGN (transmit)**

60160	ISO Transport Protocol, Data Transfer
60416	ISO Transport Protocol, Connection M.
126208	ISO Command Group Function
126992	System Time
126993	Heartbeat
126996	Product Info
127237	Heading/Track Control
127250	Vessel Heading
127258	Magnetic Variation
127502	Switch Bank Control
128259	Speed, Water referenced
128267	Water Depth
128275	Distance Log
129025	Position, Rapid Update
129026	COG & SOG, Rapid Update
129029	GNSS Position Data
129283	Cross Track Error
129285	Navigation - Route/WP Information
129284	Navigation Data
129285	Route/Waypoint Data
129539	GNSS DOPs
129540	GNSS Sats in View
130074	Route and WP Service - WP List - WP Name & Position
130306	Wind Data
130310	Environmental Parameters
130311	Environmental Parameters
130312	Temperature
130577	Direction Data
130578	Vessel Speed Components

## NMEA 0183 supported sentences

### TX / RX - GPS

Name	Description	RX	TX
DTM	Datum reference	x	
GGA	Global positioning system (GPS) fix data	x	x
GLC	Geographic position - Loran-C		
GLL	Geographic position - Latitude/longitude	x	x
GSA	GNSS DOP and active satellites	x	x
GNS	GNSS fix data	x	
GSV	GNSS satellites in view	x	x
VTG	Course over ground and ground speed	x	x
ZDA	Time and date	x	x

### TX / RX - Navigation

Name	Description	RX	TX
AAM	Waypoint arrival alarm		x
APB	Heading/track controller (autopilot) sentence B		x
BOD	Bearing origin to destination		x
BWC	Bearing and distance to waypoint - Great circle		x
BWR	Bearing and distance to waypoint - Rhumb line		x
RMB	Recommended minimum navigation information		x
XTE	Cross-track error - measured		x
RTE	Routes	x	
WPL	Waypoint location	x	

### TX/RX - Echosounder

	RX	TX
DBT	x	x
DPT	x	x
MTW	x	x
VLW	x	x
VHW	x	x

### TX / RX - Compass

Name	Description	RX	TX
HDG	Heading, deviation and variation	x	x
HDT	Heading true	x	
THS	True heading and status	x	x
ROT	Rate of turn	x	



### TX / RX - Wind

	RX	TX
MWD	x	x
MWW	x	x

### TX / RX - AIS / DSC

Name	Description	RX	TX
DSC	Digital selective calling information	x	
DSE	Expanded digital selective calling	x	
VDM	AIS VHF data-link message	x	
VDO	AIS VHF data-link own-vessel report	x	

→ **Note:** AIS sentences are not bridged to or from NMEA 2000.

### TX / RX - MARPA

	RX	TX
TTL		x
TTM		x

→ **Note:** These are only output sentences.



# NSO evo3S Installation Manual

ENGLISH



# Preface

---

## Disclaimer

As Navico is continuously improving this product, we retain the right to make changes to the product at any time which may not be reflected in this version of the manual. Please contact your nearest distributor if you require any further assistance.

It is the owner's sole responsibility to install and use the equipment in a manner that will not cause accidents, personal injury or property damage. The user of this product is solely responsible for observing maritime safety practices.

NAVICO HOLDING AS AND ITS SUBSIDIARIES, BRANCHES AND AFFILIATES DISCLAIM ALL LIABILITY FOR ANY USE OF THIS PRODUCT IN A WAY THAT MAY CAUSE ACCIDENTS, DAMAGE OR THAT MAY VIOLATE THE LAW.

This manual represents the product as at the time of printing. Navico Holding AS and its subsidiaries, branches and affiliates reserve the right to make changes to specifications without notice.

## Governing language

This statement, any instruction manuals, user guides and other information relating to the product (Documentation) may be translated to, or has been translated from, another language (Translation). In the event of any conflict between any Translation of the Documentation, the English language version of the Documentation will be the official version of the Documentation.

## Copyright

Copyright © 2019 Navico Holding AS.

## Compliance statements

### Europe

Navico declare under our sole responsibility that the product conforms with the requirements of:

- CE under RED 2014/53/EU

The relevant declaration of conformity is available in the product's section at the following website:

### United States of America

Navico declare under our sole responsibility that the product conforms with the requirements of:

- Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

**⚠ Warning:** The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

- **Note:** This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to

radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that of the receiver is connected
- Consult the dealer or an experienced technician for help

### **ISED Canada**

This device complies with ISED (Innovation, Science and Economic Development) Canada's license-exempt RSSs. Operation is subject to the following two conditions: (1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device.

La traduction française de ce document est disponible sur le site Web du produit.

### **Australia and New Zealand**

Navico declare under our sole responsibility that the product conforms with the requirements of:

- level 2 devices of the Radiocommunications (Electromagnetic Compatibility) standard 2017
- radiocommunications (Short Range Devices) Standards 2014

### **Internet usage**

Some features in this product use an internet connection to perform data downloads and uploads.

Internet usage via a connected mobile/cell phone internet connection or a pay-per-MB type internet connection may require large data usage. Your service provider may charge you based on the amount of data you transfer. If you are unsure, contact your service provider to confirm rates and restrictions.

### **Trademarks**

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Yamaha® is a registered trademark of Yamaha.

## Navico product references

This manual refers to the following Navico products:

- Broadband Radar™ (Broadband Radar)
- GoFree™ (GoFree)
- Halo™ Pulse Compression Radar (Halo Radar)

## About this manual

Images used in this manual might not exactly match the screen on your unit.

## Important text conventions

Important text that requires special attention from the reader is emphasized as follows:

→ **Note:** Used to draw the reader's attention to a comment or some important information.

⚠ **Warning:** Used when it is necessary to warn personnel that they should proceed carefully to prevent risk of injury and/or damage to equipment/personnel.

## Intended audience

This manual is written for system installers.

The manual assumes that the reader has basic knowledge about this type of equipment with regards to:

- installation work to be carried out
- nautical terminology and practices

# Contents

---

## **Introduction**

- Parts included
- Front controls
- Connectors
- Card reader

## **Installation**

- General mounting guidelines
- Bezel fitment and removal
- Cable retainer installation
- Panel mounting
- Bracket mounting

## **Wiring**

- Wiring guidelines
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  - NMEA 2000
  - NMEA 0183
- USB port
- J1939 port
- Ethernet
- HDMI ports
- Video in

## **Software setup**

- First time startup
- Software setup sequence
- The settings dialog
- System settings
- Alarms
- Radar installation
- Echosounder settings
- Autopilot settings
- Fuel settings
- Wireless settings
- Network settings

## **3rd party support**

- C-Zone
- Naviop
- Mercury
- Suzuki Marine
- Yamaha engine integration
- Evinrude engine integration
- Power-Pole
- FLIR camera setup

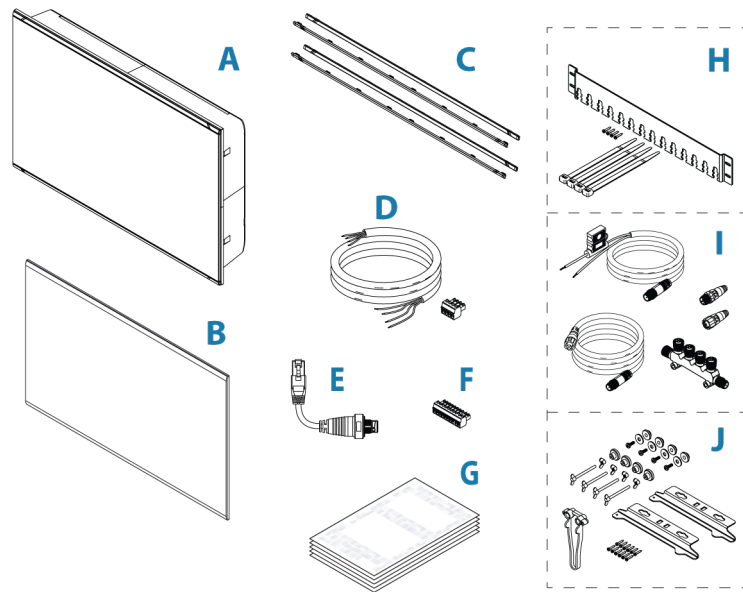
## **Appendix**

- Dimensional drawings
- Technical specifications
- Supported data

# 1

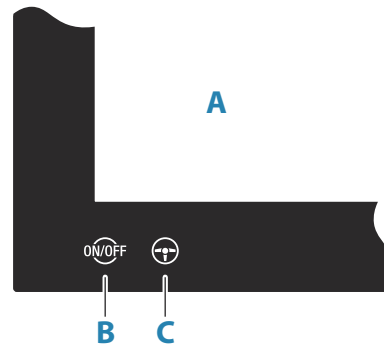
## Introduction

### Parts included



- A** Display unit
- B** Suncover
- C** Bezels
  - 1 set black bezels
  - 1 set silver bezels
- D** Power cable and connector block
- E** RJ45 to 5-pin Ethernet adapter cable
- F** NMEA 0183 connector block
- G** Documentation pack
- H** Cable retainer kit
- I** NMEA 2000 starter kit
  - **Note:** Supplied with the system pack only.
- J** Panel mounting kit

## Front controls



### A Touch screen

### B Power key

- Press and hold: turns the unit ON/OFF
- Short press once: displays the System Controls dialog
- Repeat short presses: toggles through preset dimming levels

### C WheelKey - user configurable key, refer to "*Configure WheelKey*" on page 22.

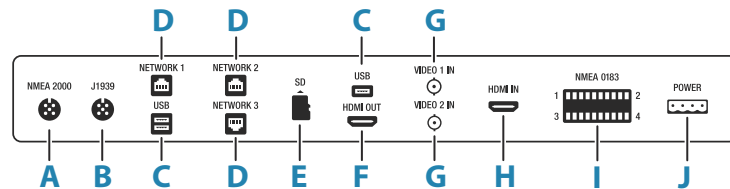
Default without an autopilot connected to the system

- Short press: toggles between panels on split screen
- Long press: maximizes active panel on split screen

Default with an autopilot connected to the system

- Short press: opens the autopilot controller and puts the autopilot in standby mode
- Long press: toggles between panels on split screen

## Connectors



**A NMEA 2000** - NMEA 2000 data

**B J1939** - J1939 engine data

**C USB** - mouse, keyboard or mass storage

**D NETWORK 1-3** - Ethernet network

**E SD** - microSD card reader

**F HDMI OUT** - HDMI video output

**G VIDEO IN** - composite video input

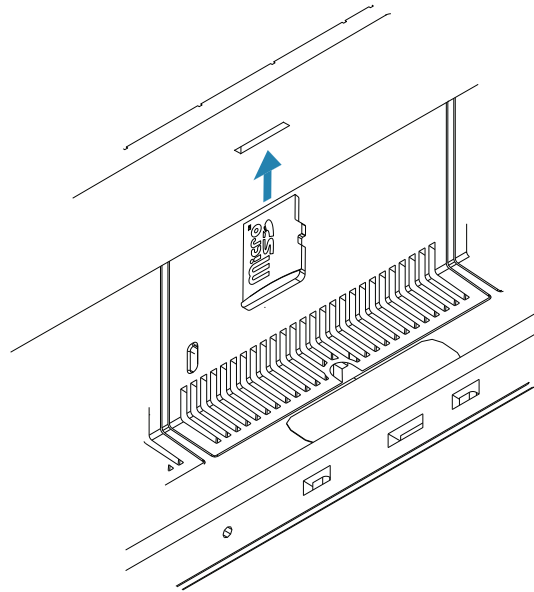
**H HDMI IN** - HDMI video input

**I NMEA 0183** - NMEA 0183 data

**J POWER** - 12 - 24 V DC input, external alarm and power control



## Card reader



A memory card can be used for:

- Chart data
- Software updates
- Transfer of user data
- System backup

→ **Note:** Do not download, transfer or copy files to a chart card. Doing so can damage chart information on the chart card.

# 2

## Installation

---

### General mounting guidelines

**⚠ Warning:** Do not install the unit in a hazardous/flammable atmosphere.

→ **Note:** Choose a mounting location that will not expose the unit to conditions that exceed the technical specifications.

#### Mounting location

Ensure that the selected area allows for:

- cable routing, cable connection and cable support
- connection and use of portable storage devices
- viewing any LED indicators
- easy access to serviceable parts

Do also consider:

- the free space around the unit to avoid overheating
- the mounting surface's structure and strength, with regard to the weight of the equipment
- any mounting surface vibration that might damage the equipment
- hidden electrical wires that might be damaged when drilling holes

#### Ventilation

Inadequate ventilation and subsequent overheating of the unit will cause unreliable operation and reduced service life.

If possible, select a location where the vessel's air conditioning system can be used to control the temperature.

Ensure that any ventilation holes are not blocked.

#### Electrical and radio frequency interference

This unit conforms to the appropriate Electromagnetic Compatibility (EMC) regulations. To ensure that the EMC performance is not compromised, the following guidelines apply:

- separate battery used for the vessel engine
- minimum 1 m (3 ft) between the device, the device's cables and any transmitting equipment or cables with radio signals
- minimum 2 m (7 ft) between the device, the device's cables and the SSB radio
- more than 2 m (7 ft) between the device, the device's cables and the radar beam

#### WiFi

It is important to test the WiFi performance before the location of the unit is decided.

Construction material (steel, aluminum, or carbon) and heavy structure might affect WiFi performance.

The following guidelines apply:

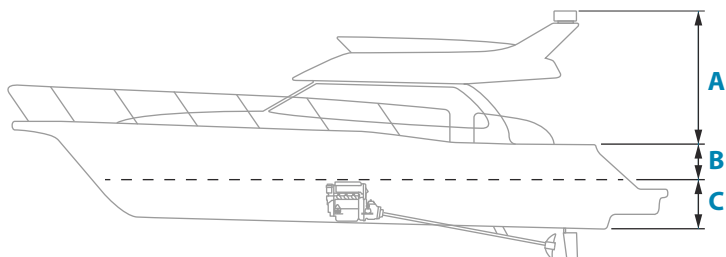
- select a location where there is a clear, direct line of sight between WiFi connected units
- keep the distance between WiFi units as short as possible
- mount the WiFi unit at least 1 m (3 ft) away from:
  - other WiFi enabled products
  - products that send wireless signals in the same frequency range
  - equipment that might generate interference

## GPS

It is important to test the GPS performance before the location of the unit is decided.

Construction material (steel, aluminum, or carbon) and heavy structure might affect GPS performance. Avoid a mounting location where metal obstacles block the view of the sky.

A well placed external GPS module can be added to overcome poor performance.



**A** Optimal location (above deck)

**B** Less effective location

**C** Not recommended location

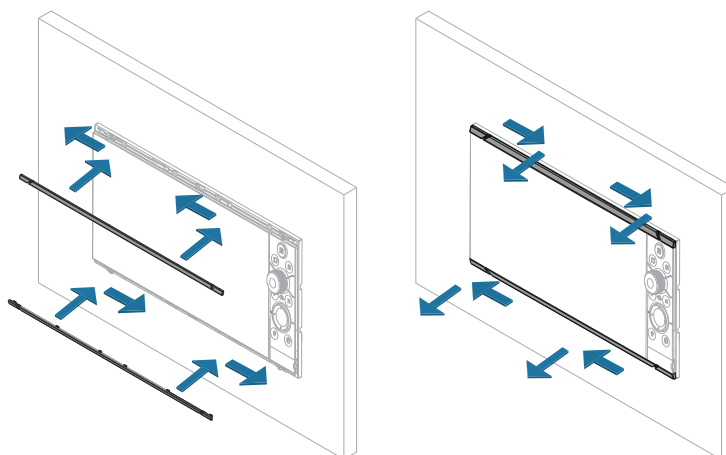
→ **Note:** Consider the lateral swinging if mounting the GPS sensor high above the sea level. Roll and pitch might give false positions and affect the true directional movement.

## Touchscreen

Touchscreen performance can be affected by the location of the unit. Avoid locations where the screen is exposed to:

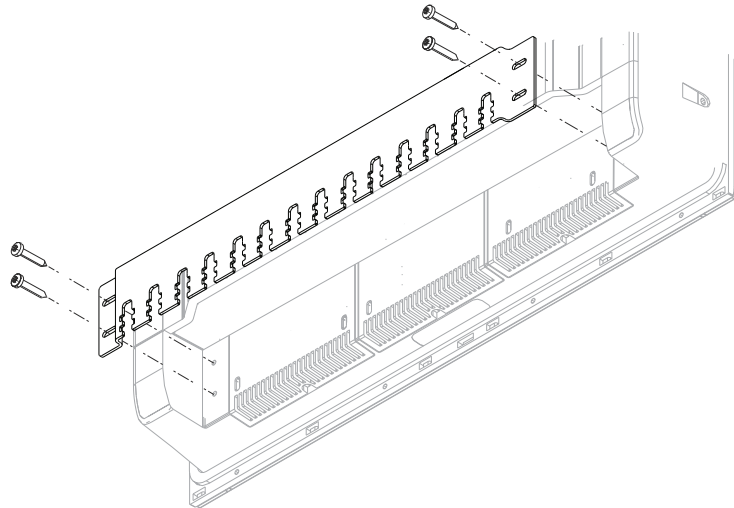
- direct sunlight
- prolonged rainfall or floating water

## Bezel fitment and removal



→ **Note:** The unit in the illustration is an example only.

## Cable retainer installation



With the cable and plug fitted in place, secure the cable to the retention bracket using a cable tie. Do not secure in such a way that it applies strain to the cable, or causes the plug or socket to be bent out of alignment.

## Panel mounting

Refer to the separate mounting template for panel mounting instructions.

## Bracket mounting

For bracket mounting refer to separate documentation supplied with the bracket kit (sold separately).

# 3

## Wiring

### Wiring guidelines

Don't:

- Make sharp bends in the cables
- Run cables in a way that allows water to flow down into the connectors
- Run the data cables adjacent to radar, transmitter, or large/high current carrying cables or high frequency signal cables.
- Run cables so they interfere with mechanical systems
- Run cables over sharp edges or burrs

Do:

- Make drip and service loops
- Use cable-tie on all cables to keep them secure
- Solder/crimp and insulate all wiring connections if extending or shortening the cables. Extending cables should be done with suitable crimp connectors or solder and heat shrink. Keep joins as high as possible to minimize possibility of water immersion.
- Leave room adjacent to connectors to ease plugging and unplugging of cables

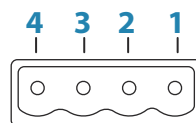
**⚠ Warning:** Before starting the installation, be sure to turn electrical power off. If power is left on or turned on during the installation, fire, electrical shock, or other serious injury may occur. Be sure that the voltage of the power supply is compatible with the unit.

**⚠ Warning:** The positive supply wire (red) should always be connected to (+) DC with a fuse or a circuit breaker (closest available to fuse rating).

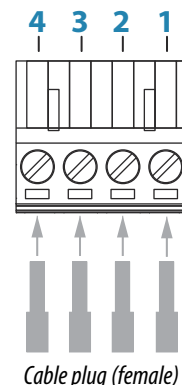
### Power

The power connector is used for power, power control and for external alarm output.

#### Power connector details



Unit socket (male)



Cable plug (female)

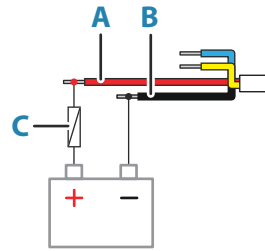
Pin	Purpose
1	DC negative
2	+12/24 V DC
3	External alarm
4	Power control

#### Power connection

The unit is designed to be powered by 12 or 24 V DC system.

It is protected against reverse polarity, under voltage, and over voltage (for a limited duration).

A fuse or circuit breaker should be fitted to the positive supply. For recommended fuse rating refer to *"Technical specifications"* on page 40.



Key	Purpose	Color
A	+12/24 V DC	Red
B	DC negative	Black
C	Fuse	

### Power control connection

The yellow wire in the power cable can be used to control how the unit is turned on and off.

#### **Power controlled by power key**

The unit will turn on/off when the power key on the unit is pressed.

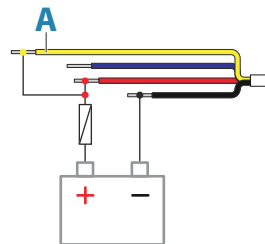
Leave the yellow power control wire disconnected and tape or heat-shrink the end to prevent shorting.

#### **Power control by supply power**

The unit will turn on/off without using the power key when power is applied/removed.

Connect the yellow wire to the red wire after the fuse.

→ **Note:** The unit cannot be powered down by power button, but can be put in to standby mode (the screen backlight turns off).

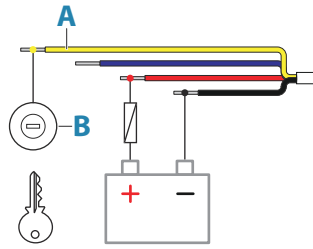


Key	Purpose	Color
A	Power control wire, connected to supply power	Yellow

#### **Power controlled by ignition**

The unit will turn on once ignition is turned on to start engines.

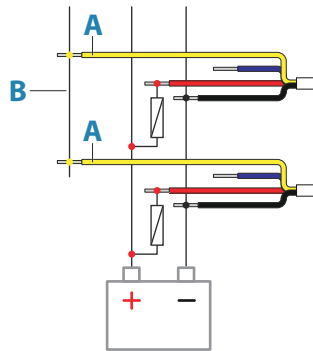
→ **Note:** Engine start batteries and house batteries should have a common ground connection.



Key	Purpose	Color
<b>A</b>	Power control wire	Yellow
<b>B</b>	Ignition switch	

### ***Power controlled by master slave bus***

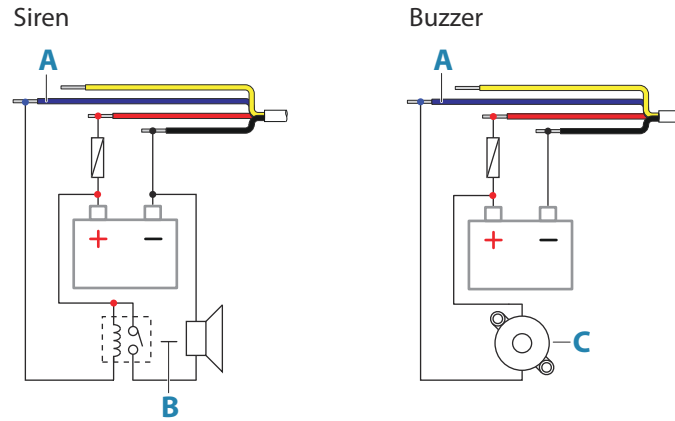
The yellow power control wire can either be an input that will turn on the unit when power is applied, or an output that turns on other devices when the unit is powered on. It can be configured at the installation stage to control the power state of displays and compatible devices. When commissioning the system, the unit can be set to be a power control slave or power control master.



Key	Purpose	Color
<b>A</b>	Power control wire	Yellow
<b>B</b>	Master slave bus	

If a unit is configured as power control master and turned on by the power key, it will output voltage on the power control bus. This will power on both other power master units and power slave units. If a unit is set to power control slave, it cannot be powered down using its own power key while a power control master unit is turned on. Pressing the power key will set the unit to standby. If all power control masters are off, power control slaves can be turned on using their own power key. This however will not turn on any other units connected to the power bus.

## External alarm



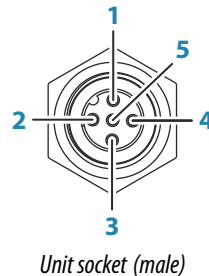
For sirens that draw more than 1 A, use a relay.

Key	Purpose	Color
<b>A</b>	External alarm output	Blue
<b>B</b>	Siren and relay	
<b>C</b>	Buzzer	

## NMEA 2000

The NMEA 2000 data port allows receiving and sharing of a multitude of data from various sources.

### Connector details



Pin	Purpose
<b>1</b>	Shield
<b>2</b>	NET-S (+12 V DC)
<b>3</b>	NET-C (DC negative)
<b>4</b>	NET-H
<b>5</b>	NET-L

### Plan and install an NMEA 2000 network

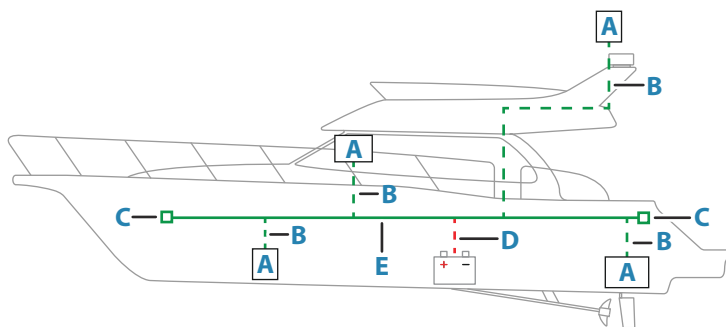
An NMEA 2000 network consists of a powered backbone from which drop cables connect to NMEA 2000 devices. The backbone needs to run within 6 m (20 ft) of the locations of all products to be connected, typically in a bow to stern layout.

The following guidelines apply:

- The total length of the backbone should not exceed 100 meters (328 ft)



- A single drop cable has a maximum length of 6 meters (20 ft). The total length of all drop cables combined should not exceed 78 meters (256 ft)
- The backbone needs to have a terminator at each end of the backbone. The terminator can be a terminator plug or a unit with built-in terminator



- A** NMEA 2000 device
- B** Drop-cable
- C** Terminator
- D** Power supply
- E** Backbone

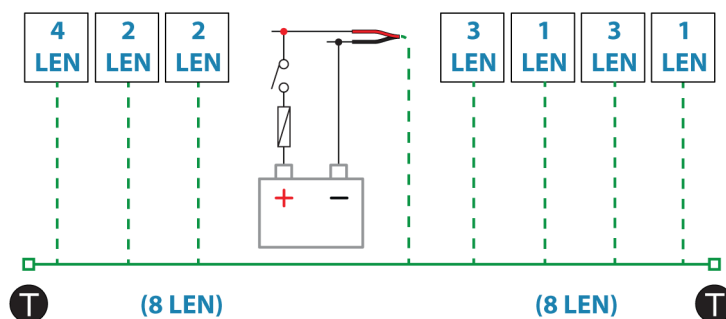
### Powering the network

The network requires its own 12 V DC power supply, protected by a 3 amp fuse.

For smaller systems: connect power at any location in the backbone.

For larger systems: connect power at a central point in the backbone to balance the voltage drop of the network. Make the installation such that the load/current draw on each side of the power node is equal.

→ **Note:** 1 LEN (Load Equivalency Number) equals 50 mA current draw.

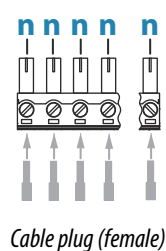
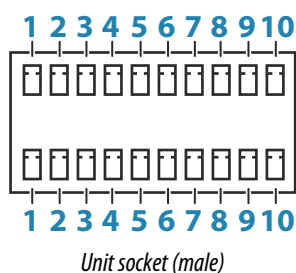


→ **Note:** Do not connect the NMEA 2000 power cable to the same terminals as the engine start batteries, autopilot computer, bow thruster or other high current devices.

### NMEA 0183

The unit has a built in NMEA 0183 serial interface, providing both input and output. The port(s) uses the NMEA 0183 (serial balanced) standard, and can be configured in the software for different baud rates up to 38,400 baud.

## NMEA 0183 connector details



Pin	Top row	Bottom row	Purpose
<b>1</b>	Port 1	Port 3	TX_B (-)
<b>2</b>	Port 1	Port 3	TX_A (+)
<b>3</b>	Port 1	Port 3	RX_B (-)
<b>4</b>	Port 1	Port 3	RX_A (+)
<b>5</b>	Port 2	Port 4	TX_B (-)
<b>6</b>	Port 2	Port 4	TX_A (+)
<b>7</b>	Port 2	Port 4	RX_B (-)
<b>8</b>	Port 2	Port 4	RX_A (+)
<b>9</b>	Port 2	Port 4	Common
<b>10</b>	Port 2	Port 4	Shield
<b>n</b>	4 to 10 pin connector(s) can be used. The pin number (n) depends on the connectors location in the unit socket.		

→ **Note:** Ports 1 and 3 conform to the NMEA 0183 standard, while ports 2 and 4 adds Common and Shield connections to conform to NMEA 0183-HS. These additional connections can be used if the connecting high-speed device supports it.

### Talkers and listeners

Only one talker (output device) can be connected to a serial input (RX) on the unit, in accordance with the NMEA0183 protocol. However, an output port (TX) on the unit may be connected to up to three listener (receiver) devices, dependent on the hardware capabilities of the receiver.

### USB port

The USB port can be used to:

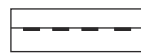
- connect a keyboard
- connect a mouse
- connect a storage device
- connect a card reader

→ **Note:** If you want to read chart cards using a USB card reader connected to the USB port, an MI10 USB card reader is required.

The USB devices should be standard PC compatible hardware.

→ **Note:** USB cable length should not exceed 5 m when using regular cables. Lengths over 5 m may be possible with the use of an active USB cable.

## USB connector details



*Unit socket (female)*

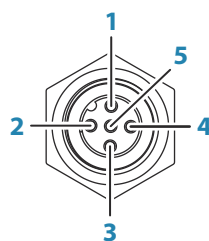
The unit is equipped with standard USB type-A connector(s).

## J1939 port

The J1939 port can be used for engine communication and diagnostics. This option is commonly used for diesel engines.

**⚠ Warning:** Before connecting to the J1939 bus, ensure that your engine manufacturer not have restrictions for connecting other equipment to this bus.

## J1939 connector details



*Unit socket (male)*

Pin	Purpose
1	Shield
2	Not used
3	CAN GND
4	NET-H
5	NET-L

## Converter cables

Various converter cables are available for connecting to the J1939 port.

## Engine connection

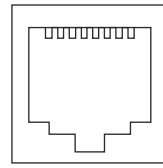
For information about connecting an engine to the J1939 interface refer to the documentation supplied by the engine manufacturer.

## Ethernet

The Ethernet port(s) can be used for transfer of data and synchronization of user created data. It is recommended that each device in the system is connected to the Ethernet network.

No special setup is required for establishing an Ethernet network.

## Ethernet connector details



*Unit socket (female)*

The unit is equipped with standard RJ45 connector(s).

## Ethernet expansion device

Connection of network devices can be made via an Ethernet expansion device. Additional expansion devices can be added to provide the required number of ports.

## HDMI ports

### HDMI connector details



*Unit socket (female)*

The unit is equipped with standard HDMI (Type A) connector(s).

### HDMI input

The unit can be connected to an external video source to display video images on its display.

### HDMI out

The unit can be connected to an external monitor to replicate video at a remote location. The image is shown on the external monitor at the units own native resolution, so the external monitor should support the same resolution or be able to scale.

→ **Note:** Some HDMI TV displays may apply over-scan, which will in effect crop the image possibly causing loss of important content. Check the display manual for an option to disable over-scan or adjust scaling.

## Video in

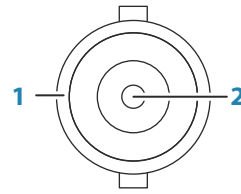
The unit can be connected to two composite video sources, and display video images on its display.

→ **Note:** Camera cables are not supplied, and will need to be selected to suit termination - BNC at the unit, and typically BNC or RCA plug at the camera end.

→ **Note:** The video images will not be shared with another unit via the network. It is only possible to view video on the unit connected to the video source.

→ **Note:** Both NTSC and PAL formats are supported.

## Video in connector details



*Unit socket (female)*

Pin	Purpose
1	Ground
2	Signal

## Video input configuration

Configurations to video input are made in the video panel. Refer to the Operator Manual for more information.

# 4

## Software setup

### First time startup

When the unit is started for the first time, or after a reset, the unit displays a series of dialogs. Respond to the dialog prompts to make fundamental settings.

You can perform further setup and later change settings using the system settings dialogs.

### Software setup sequence

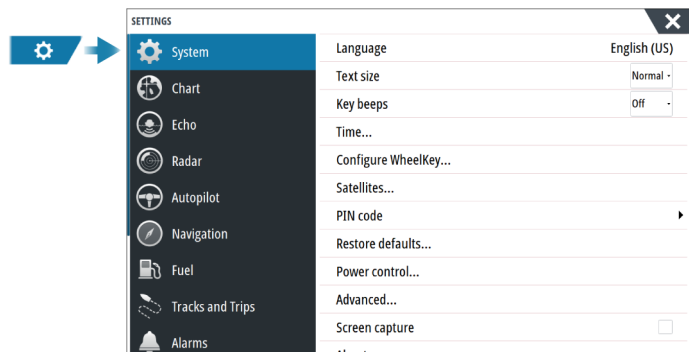
- 1 General settings** - refer to "*System settings*" on page 22.
  - Make general settings as desired
  - Configure the power control
- 2 Advanced settings** - refer to "*Advanced*" on page 23.
  - Enable or disable features
  - Review the advanced setting options and make changes as desired
- 3 Source selection** - refer to "*Network settings*" on page 32.
  - Make sure that the proper external data sources have been selected
- 4 Feature setup**
  - Configure specific features as described later in this chapter

### The settings dialog

The software setup is done from the settings dialog.



### System settings



### Boat settings

Used to specify the physical attributes of the boat.

### Time

Configure time settings to suit vessel location, along with time and date formats.

### Configure WheelKey

Configures the action of the WheelKey on the front of the unit.

## PIN code

Sets a PIN code to prevent unauthorized access to your system's settings.

**Note:** Record the PIN code and store it in a safe place.

When you establish password protection, the PIN code must be entered when any of the following are selected. After the correct PIN code is entered, all of them can be accessed without re-entering the PIN code.

- Settings, activated from the home page or system controls dialog
- Alarms, activated from the toolbar
- Storage, activated from the toolbar
- Store, activated from the toolbar

## Power control setup

Determines unit response to signal applied to the power control wire. Refer to "*Power control connection*" on page 14.

This setting is only applicable if the yellow wire is used for power control.

- Set to slave if the yellow wire is connected to ignition or to a stand-alone switch
- Set to master to make this device turn other devices connected to the master slave bus on and off

When a master unit is turned on or off, all units connected to the same master slave bus turns on or off.

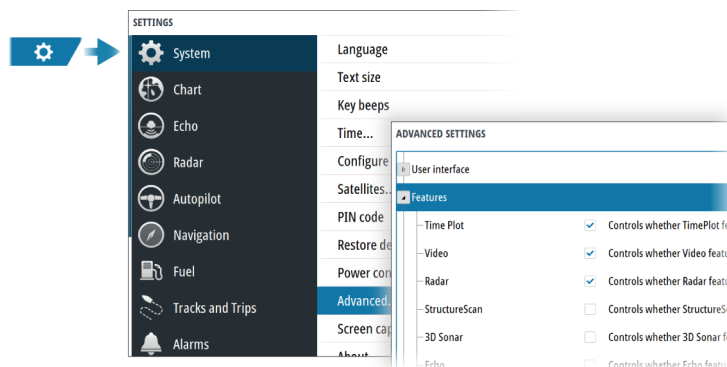
While a master unit is on, a slave unit cannot be turned off.

If no master unit is turned on, slave units can be turned on or off individually.

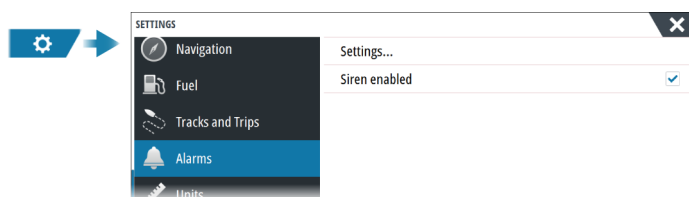
## Advanced

### Enabling or disabling features

Use the feature option to enable or disable features that are not automatically enabled or disabled by the system.



## Alarms



## Settings

List of all available alarm options in the system, with current settings. From this list you can activate, deactivate and change alarm limits.

## Siren enable

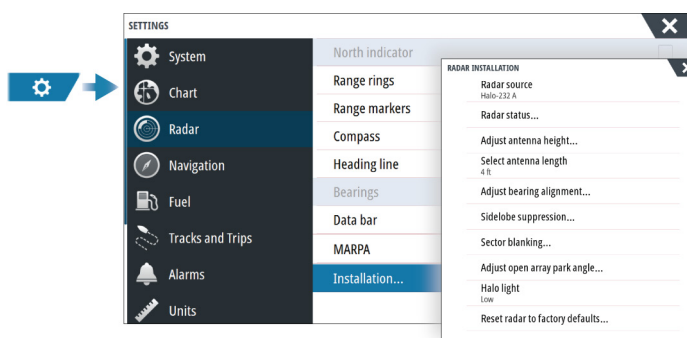
The Siren enabled option must be set in order for the unit to activate the buzzer when an alarm condition arises.

Its setting also determines the operation of the external alarm output.

## Radar installation

The radar system requires radar sensor specific settings in order to adjust for a number of variables found in different installations.

→ **Note:** The installation settings available depends on the radar sensor.



## Radar source

In a system with more than one radar sensor, the device to configure is selected from this menu.

→ **Note:** Radars that support dual radar mode are represented twice in the source list, with an A and B suffix.

## Radar status

Displays scanner information and scanner features, primarily used for information and to assist with fault finding.

## Adjust antenna height

Set the radar scanner height relative to the water surface. The Radar uses this value to calculate the correct STC settings.

## Select antenna length

Select the proper antenna length.

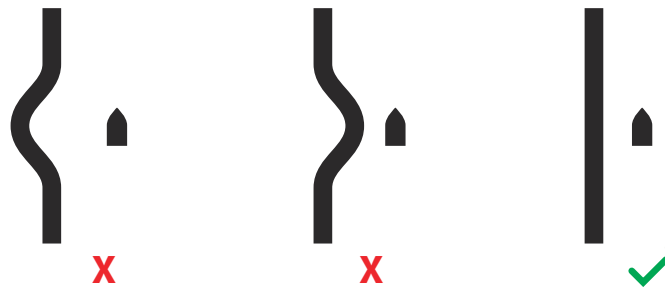
## Adjust range offset

The radar sweep should commence at your vessel (a radar range of zero). You may need to adjust the radar range offset to achieve this. If this is set incorrectly, a large dark circle in the center of the sweep might occur. You might notice straight objects such as straight sea walls or piers having curves or an indentation. Objects close to your vessel may appear pulled in or pushed out.

Adjust the range offset as below when the vessel is about 45 to 90 m (50 to 100 yards) from a straight-walled jetty or similar feature that produces a straight line echo on the display.

- 1 Point the vessel towards the jetty
- 2 Adjust the range offset to make the jetty echo appear as a straight line on the display





### Adjust bearing alignment

This option is used to align the heading marker on the screen with the center line of the vessel. This will compensate for any slight misalignment of the scanner during installation.

Misalignment that is not corrected for will compromise target tracking and can result in dangerous misinterpretation of potential navigation hazards.

Any inaccuracy will be evident when using MARPA or chart overlay.

- 1 Point the vessel towards a stationary isolated object, or towards a far range AIS where the AIS icon matches the radar echo
- 2 Adjust the coarse and fine bearing alignment so that the heading line touches the end of the selected object

### Sidelobe suppression

Occasionally false target returns can occur adjacent to strong target returns such as large ships or container ports. This occurs because not all of the transmitted radar energy can be focused into a single beam by the radar antenna, a small amount of energy is transmitted in other directions. This energy is referred to as sidelobe energy and occurs in all radar systems. The returns caused by sidelobes tend to appear as arcs.

→ **Note:** This control should only be adjusted by experienced radar users. Target loss in harbor environments may occur if this control is not adjusted correctly.

When the radar is mounted where there are metallic objects near the radar, sidelobe energy increases because the beam focus is degraded. The increased sidelobe returns can be eliminated using the sidelobe suppression control.

By default, this control is set to auto and normally should not need to be adjusted. However, if there is significant metallic clutter around the radar, sidelobe suppression may need to be increased.

To adjust the sidelobe suppression value:

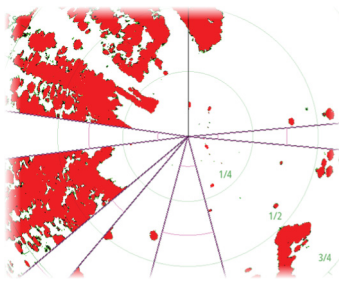
1. Set radar range to between 1/2 nm to 1 nm and the sidelobe suppression to auto
2. Take the vessel to a location where sidelobe returns are likely to be seen. Typically, this would be near a large ship, container port, or metal bridge.
3. Traverse the area until the strongest sidelobe returns are seen.
4. Change auto sidelobe suppression to OFF, then adjust the sidelobe suppression control just enough to eliminate the sidelobe returns. You may need to monitor 5-10 radar sweeps to be sure they have been eliminated.
5. Traverse the area again and readjust if sidelobe returns still occur.

### Sector blanking

Radar installed in close proximity to a mast or structure could cause unwanted reflections or interference to appear on the radar image. Use the sector blanking feature to stop the radar from transmitting on up to four sectors in the image.

→ **Note:** Sectors are setup relative to the heading line of the radar. The bearing of the sector is measured from the center line of the sector.

→ **Note:** Sector blanking should be applied very carefully to avoid reducing the radar's usefulness in identifying valid and potentially dangerous targets.



Main radar PPI



Radar overlay on a chart

### Adjust open array park angle

The park angle is the final resting position of the antenna relative to the heading line of the radar when the radar is set to standby. The antenna will stop rotating at the desired offset.

### Adjust local interference reject

Interference from some onboard sources can interfere with the Broadband radar. One symptom of this could be a large target on the screen that remains in the same relative bearing even if the vessel changes direction.

### Halo light

Controls the levels of the Halo Radar blue accent lighting. The accent lighting can only be adjusted when the radar is in standby mode.

→ **Note:** The blue accent pedestal lighting might not be approved for use in your boating location. Check your local boating regulations before turning the blue accent lights ON.

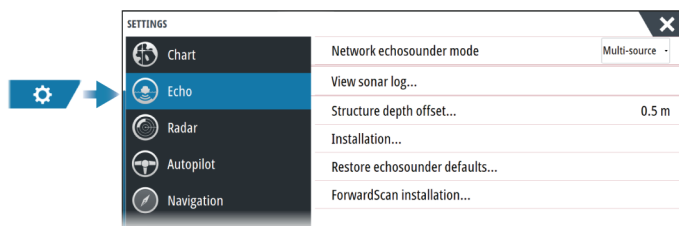
### Reset radar to factory defaults

Clears all user and installer settings applied to the selected radar source, and restores factory settings.

→ **Note:** Use this option with caution. Take note of current settings first, especially those set by the operator if radar has already been in active service.

## Echosounder settings

A compatible echosounder module (or another unit which has built-in sonar) shared over the Ethernet network is required to view echosounder images on the unit.



### Network echosounder mode

The network echosounder mode setting selects whether only one or multiple echosounder sources can be selected at the same time.

→ **Note:** Changing the mode requires that all connected sources are restarted.

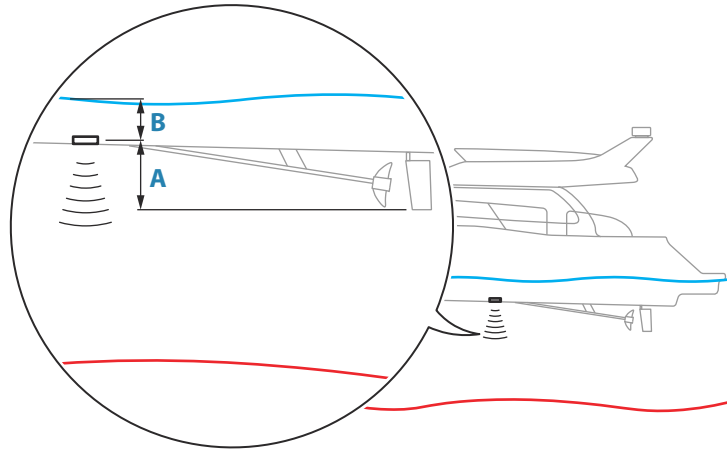
### Overlay DownScan

When a DownScan capable transducer is connected to your system, you can overlay DownScan images on the regular Echosounder image.

When overlay DownScan is activated, the Echosounder panel menu expands to include basic DownScan options.

## Structure depth offset

All transducers measure water depth from the transducer to the bottom. As a result, water depth readings do not account for the distance from the transducer to the lowest point of the boat in the water or from the transducer to the water surface.



- To show the depth from the lowest point of the vessel to the bottom, set the offset equal to the vertical distance between the transducer and the lowest part of the vessel, **A** (negative value).
- To show the depth from the water surface to the bottom, set the offset equal to the vertical distance between the transducer and the water surface, **B** (positive value)
- For depth below transducer, set the offset to 0.

## Use depth and temp data from

Selects from which source the depth and temperature data is shared on the NMEA 2000 network.

## Installation

Use this dialog to setup and configure available sources.

Field	Value
Source	
Search depth	Unlimited
Depth offset (m)	0.0
Water speed calibration (%)	100
Water speed averaging	1 sec
Water temperature...	
Transducer type	

### Source

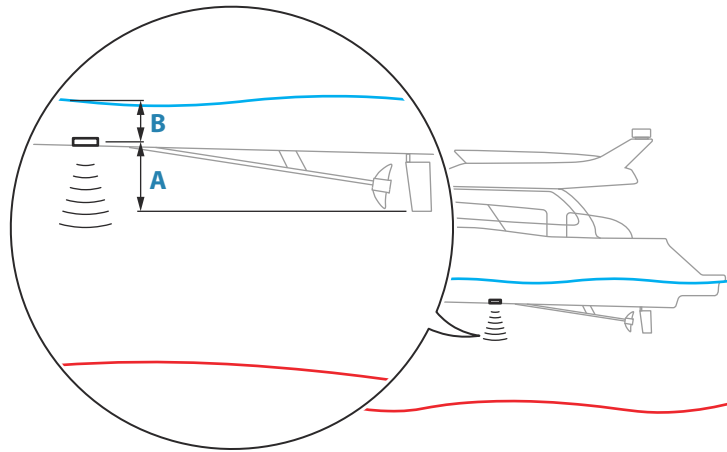
Select this option to display a list of sources available for setup. The settings you make in the rest of the dialog pertain to the source selected.

### Search depth

Noise may cause the echosounder to search for unrealistic depths. By setting the search depth manually the system displays echoes received from objects within the set depth range.

### Depth offset

All transducers measure water depth from the transducer to the bottom. As a result, water depth readings do not account for the distance from the transducer to the lowest point of the boat in the water or from the transducer to the water surface.



- To show the depth from the lowest point of the vessel to the bottom, set the offset equal to the vertical distance between the transducer and the lowest part of the vessel, **A** (negative value).
- To show the depth from the water surface to the bottom, set the offset equal to the vertical distance between the transducer and the water surface, **B** (positive value)
- For depth below transducer, set the offset to 0.

### **Water speed calibration**

Water speed calibration is used to adjust the speed value from the paddle wheel to match the actual boat speed through the water. Actual speed can be determined from GPS speed over ground (SOG) or by timing the boat over a known distance. Water speed calibration should be performed in calm conditions, with minimal wind and current movement.

Increase this value above 100 % if the paddle wheel is under reading, and decrease this value if it is over reading. For example, if the average water speed reads 8.5 knots (9.8 MPH) and SOG records 10 knots (11.5 MPH) the calibration value needs to be increased to 117 %. To calculate the adjustment, divide the SOG by the paddlewheel speed, and multiply the product by 100.

Calibration range: 50-200 %. Default is 100 %.

### **Water speed averaging**

Averages water speed by measuring your speed at a selected interval of time. Water speed intervals range from one to thirty seconds. For example if you select five seconds, your displayed water speed will be based on averaging over 5 seconds of sampling.

Calibration range: 1-30 seconds. Default is 1 second.

### **Water temperature calibration**

Temperature calibration is used to adjust the water temperature value from the sonar transducer. It may be required to correct for localized influences to the measured temperature.

Calibration range: -9.9° - +9.9°. Default is 0°.

→ **Note:** Water temperature calibration only appears if the transducer is temperature capable.

### **Transducer type**

→ **Note:** The transducer type is automatically set for transducers that support Transducer ID (XID) and is not user selectable.

Transducer type is used for selecting the transducer model connected to the sonar module. The transducer selected will determine what frequencies the user can select during sonar operation. In some transducers with built-in temperature sensors, the temperature reading may be inaccurate or not available at all if the wrong transducer is selected. Transducer temperature sensors are one of two impedances - 5k or 10k. Where both options are given for the same model transducer, refer to paperwork supplied with transducer to determine impedance.

## Restore echosounder defaults

Restore echosounder settings to the factory supplied defaults.

## ForwardScan installation

Available when the ForwardScan feature is connected.

For setup information, refer to the Operator Manual.

## LiveSight installation

Available when a LiveSight transducer is connected.

For setup information, refer to the documentation following the LiveSight transducer.

## Autopilot settings

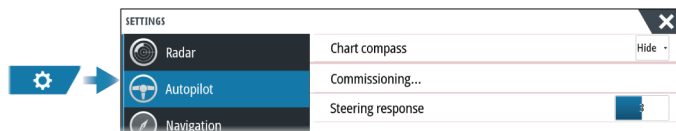
The Autopilot settings dialog depends on which autopilot computer that is connected to the system. If more than one autopilot is connected, the Autopilot settings dialog shows option for the active autopilot.

The autopilot settings can be split between settings done by the user, and settings done during installation and commissioning of the autopilot system.

- User settings can be changed for various operational conditions or user preferences.
- Installation settings are defined during commissioning of the autopilot system. No changes should later be done to these settings.

The following sections describe the installation settings per autopilot computer. For user settings, refer to the Operator manual.

## NAC-1 specific installation settings



### Commissioning

Used to calibrate your boat's steering (cable steer or hydraulic steering) with the NAC-1.

- **Note:** The autopilot must be commissioned prior to first use and any time after autopilot default settings have been restored.

### Cable steer calibration

- **Note:** The rudder source must be set to rudder feedback to be able to run this calibration

Start the calibration process by selecting the rudder feedback calibration option, and follow the onscreen instructions.

- **Note:** When centering the motor during the calibration process, ensure that the motor is centered visually when the dialog shows 0 value. If not, center the motor visually before pressing OK to align the physical position with the dialog value.

When the calibration process is completed, select the rudder test option to confirm the calibration.

If the calibration does not pass the rudder test:

- confirm that motor is moving
- confirm that the rudder feedback reading moves according to motor rotation
- check the NAC-1 drive cable
- confirm that the motor can be manually moved smoothly in each direction
- check for other mechanical issues
- check wiring connections
- repeat the rudder calibration.

### Hydraulic system calibration

Virtual rudder feedback (VRF) calibration is used for vessels with hydraulic steering when no rudder feedback is available.

→ **Note:** The rudder source must be set to VRF to be able to run this calibration.

Start the calibration process by selecting the VRF calibration option, and follow the onscreen instructions.

→ **Note:** When the autopilot attempts to turn the motor during the calibration process, ensure that the motor movement is noticeable and that the motor is turning in the correct direction before selecting **Yes** on the dialog. When **No** is selected, the NAC-1 reverses direction and increases power the next time it turns the motor during the calibration process.

→ **Note:** You may have to select **No** more than once to ensure the pump provides enough power to turn the motor at high boat speed.

### Steering response

Used to increase or decrease the steering sensitivity. A low response level reduces the rudder activity and provides a more loose steering. A high response level increases the rudder activity and provides more tight steering. A too high response level will cause the boat to make S movements.

### NAC-2/NAC-3 specific installation settings

For setup and commissioning of the NAC-2 or NAC-3, refer to the commissioning manual included with the autopilot computer.

### AC70/AC80 Specific installation settings

The AC70/AC80 computers do not have any specific installation settings available in the MFD.

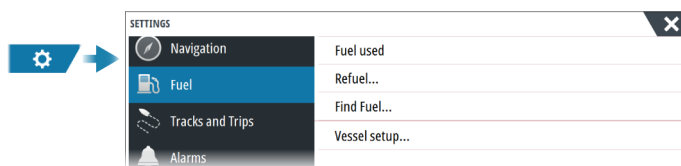
→ **Note:** The MFD cannot be used to configure or commission an AP70/AP80 system. For more information, refer to the documentation included with the autopilot system.

## Fuel settings

The fuel utility monitors a vessel's fuel consumption. This information is totaled to indicate trip and seasonal fuel usage, and is used to calculate fuel economy for display on instrument pages and the data bar.

To use the utility, a Navico Fuel Flow sensor, or a NMEA 2000 engine adaptor cable/gateway with Navico Fuel Data Storage device must be fitted to the vessel. The Navico Fuel Flow sensor, does not require the use of a separate Fuel Storage device. Refer to the engine manufacturer or dealer for information on whether or not your engine provides a data output, and what adaptor is available to connect to NMEA 2000.

Once the physical connection is made, ensure source selection is completed. Multiple engine installations using Fuel Flow sensors, or Fuel Data Storage devices, require setup of related engine location in the Device list. For general source selection information, refer to "*Network settings*" on page 32.



### Vessel setup

The Vessel setup dialog must be used to select the number of engines, the number of tanks and vessel's total fuel capacity across all tanks.

VESSEL SETUP	
Fuel remaining measurement	Fuel consumed by engine(s)
Number of Engines	2
Number of Fuel Tanks	2
Vessel total fuel capacity (L)	0
Nominal fuel consumption (NM/L)	1.05669
<div style="display: flex; justify-content: space-between;"> <span>Save</span> <span>Cancel</span> </div>	

### Fuel remaining measurement

The Fuel remaining measurement can be determined from fuel used by engine(s), or fuel level from tank sensors. Nominal fuel consumption is required to set the scale on the fuel economy gauge. This value should be determined from experience, over time. Alternatively the boat builder or designer may be able to give an approximate value to use.

- **Note:** Fuel remaining measurement taken from level sensors while underway can get inaccurate readings due to vessel movement.
- **Note:** Nominal fuel consumption setting should be determined taking into account typical vessel loads. That is, filled fuel and water tanks, stowed tender, supplies, etc.

### Fuel flow configuration

After the number of engines is set, it is required to set which fuel flow sensor is connected to which engine. Under Device list on the Network page, view the Device Configuration dialog for each sensor, and set the Location to match the engine the device is connected to.

**Unconfigure** - defaults the device which clears all user settings.

**Reset Fuel Flow** - restores only the Fuel K-Value setting, if set in Calibrate. Only Navico devices can be reset.

DEVICE LIST	
Model ID	Serial No.
EP-10: Fuel Flow (Center)	3766245955646228644

EP-10: FUEL FLOW - DEVICE INFORMATION	
Device:	EP-10: Fuel Flow
Name:	
Manufacturer:	Lowrance
Software Ver:	1.2.0 G0395D
Model:	1.0.0
Address:	48
S/N:	3766245955646228644
Instance:	0
Status:	OK

EP-10: FUEL FLOW - DEVICE CONFIGURATION	
Configuration	
Device	EP-10: Fuel Flow
Location	Port
Advanced Options	
Location	Port
Instance	Starboard
	Unknown
<div style="display: flex; justify-content: space-between;"> <span>Unconfigure</span> <span>Reset Fuel Flow.</span> </div>	

### Calibrate

Calibration may be required to accurately match measured flow with actual fuel flow. Access calibration from the Refuel dialog. Calibration is only possible on Navico's Fuel Flow sensor.

1. Start with a full tank and run the engine as it would normally be operated.
2. After at least several liters (a few gallons) have been used, the tank should be fully refilled, and the Set to full option selected.
3. Select the Calibrate option.
4. Set the actual amount used based on amount of fuel added to the tank.
5. Select OK to save settings. The Fuel K-Value should now show a new value.

- **Note:** To calibrate multiple engines repeat the steps above, one engine at a time. Alternatively, run all engines simultaneously, and divide the Actual amount used by the number of engines. This assumes reasonably even fuel consumption on all engines.

- **Note:** The Calibrate option is only available when Set to full is selected, and a Fuel Flow is connected and set up as a source.
- **Note:** A maximum of 8 engines is supported using Fuel Flow sensors.

## Fuel Level

With the use of a Navico Fluid Level device connected to a suitable tank level sensor, it is possible to measure the amount of fuel remaining in any equipped tank. The number of tanks must be set in Vessel Setup dialog, initiated from the Fuel setting options page, to allow discrete tank assignment of the Fluid Level devices.

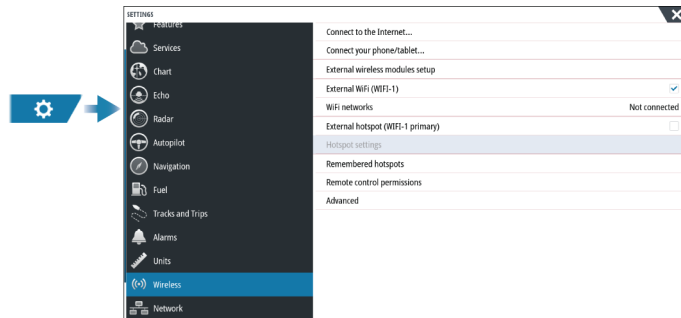
Select Device list on the Network page, and view the Device Configuration dialog for each sensor, and set the Tank location, Fluid type, and Tank size.

For setting up the Instrument bar or a gauge on the Instrument page with Fluid Level device data, refer to the Operator Manual.

- **Note:** A maximum of 5 tanks is supported using Fluid Level devices.
- **Note:** Tank data that is output by a compatible engine gateway can also be displayed, however tank configuration for such a data source is not possible from this unit.

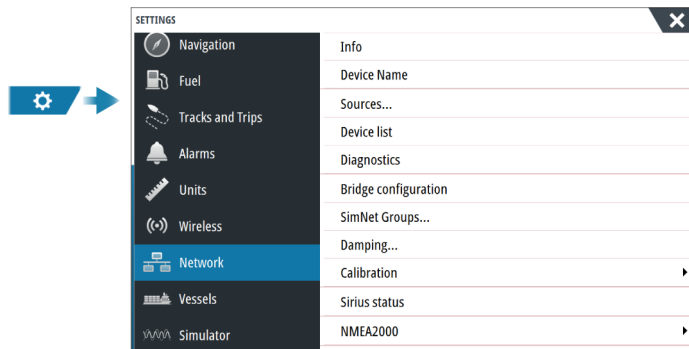
## Wireless settings

Provides configuration and setup options for the wireless functionality.



For further details about wireless setup and connectivity, refer to the Operator Manual.

## Network settings



### Device name

Assigning a name is useful in systems using more than one device of the same type and size.

### Sources

Data sources provide live data to the system.

When a device is connected to more than one source providing the same data, the user can choose the preferred source. Before commencing with source selection make sure all external devices and networks are connected and turned on.



### **Auto Select**

The Auto Select option looks for all sources connected to the device. If more than one source is available for each data type, selection is made from an internal priority list. This option is suitable for the majority of installations.

### **Manual source selection**

Manual selection is generally only required where there is more than one source for the same data, and the automatically selected source is not the one desired.

### **Group source selection**

The unit can use the same data sources that all other products on the network use, or alternatively use a data source independently from other units.

If the unit is part of a source group, all source selection changes will affect all units belonging to the same group.

→ **Note:** In order to enable group selection, the unit must be set to the Simrad group.

Devices with no selected group can use different sources than the rest of the network devices.

### **Advanced source selection**

This allows the most flexible and precise manual control over which devices provide data.

Occasionally auto select might not assign the desired source, which can be corrected using the advanced source selection.

### **Device list**

Selecting a device in this list will bring up additional details and options for the device.

All devices allow allocation of an instance number in the configure option. Set unique instance numbers on any identical devices on the network to allow the unit to distinguish between them. The data option shows all data being output by the device.

→ **Note:** In most cases, setting the instance number on a 3rd party product is not possible.

### **Diagnostics**

Provides information useful for identifying an issue with the network.

### **NMEA 2000**

Provides information on NMEA 2000-bus activity.

→ **Note:** The following information might not always indicate an issue that can be simply resolved with minor adjustment to network layout or connected devices and their activity on the network. However, Rx and Tx errors are most likely indicating issues with the physical network, which can be resolved by correcting termination, reducing backbone or drop lengths, or reducing the number of network nodes (devices).

### **UDB**

Provides information on Ethernet activity.

### **J1939**

Provides information on J1939-bus activity.

### **SimNet groups**

This function is used to control parameter settings, either globally or in groups of units. The function is used on larger vessels where several units are connected to the NMEA 2000 network. By assigning several units to the same group, a parameter update on one unit will have the same effect on the rest of the group members.

If any of the settings require discrete control, set the group to None.

## **Damping**

If data appears erratic or too sensitive, damping may be applied to make the information appear more stable. With damping set to off, the data is presented in raw form with no damping applied.

## **Calibration**

An offset (positive or negative) can be applied to correct data inaccuracies from NMEA 2000 sources.

→ **Note:** Any calibrations made here will only be applied locally to this unit. Other devices on the network will not have these offsets applied.

## **NMEA 2000 setup**

### **Receive waypoint**

Select this option to allow another device capable of creating and exporting waypoints via NMEA 2000 to transfer directly to this unit.

### **Send waypoint**

Select this option to allow this unit to send waypoints to another device via NMEA 2000.

→ **Note:** The system can only transmit or receive one waypoint at a time on creation of that waypoint. For bulk import or export of waypoints see the operator manual.

## **NMEA 0183 setup**

The NMEA 0183 port(s) must be set to suit the speed of connected devices, and can be configured to output only the sentences required by listening devices.

### **Receive waypoint**

Select this option to allow a device capable of creating and exporting waypoints via NMEA 0183 to transfer directly to this unit.

### **Baud rate**

This should be set to correspond with devices connected to the NMEA 0183 input and output. The input and output (Tx, Rx) use the same baud rate setting.

→ **Note:** AIS transponders typically operate at NMEA 0183-HS (high speed), and will require the baud rate to be set to 38,400.

### **Serial output**

Selection determines whether the data is output via Tx lines, and will enable editing of the output sentences list.

### **Serial output sentences**

This list allows control over which sentences that are transmitted to other devices from the NMEA 0183 port. Due to the limited bandwidth of NMEA 0183 it is desirable to only enable the data that is required. The less sentences that are selected, the higher the output rate of the enabled sentences.

### **Ethernet/WiFi**

The NMEA 0183 data stream is output and made available to tablet devices and PCs, via WiFi or Ethernet connection. The dialogue provides IP and port data typically required for configuring the application on the third party device.

→ **Note:** Other MFDs cannot decode this information back to NMEA 0183, to use the data as a source. To share data a physical NMEA 2000 or NMEA 0183 connection is still required.

## **J1939 settings**

### ***Silent mode***

When enabled the unit only listens to the J1939 port(s).

When disabled the unit sends a request to the connected device for specific data.

→ **Note:** For communication details refer to the engine manufacturer.

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## 3rd party support

### C-Zone

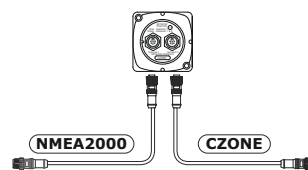
#### CZone connection to NMEA 2000

When interfacing to CZone network it is recommended to use a BEP Network interface bridge to join the two network backbones together.

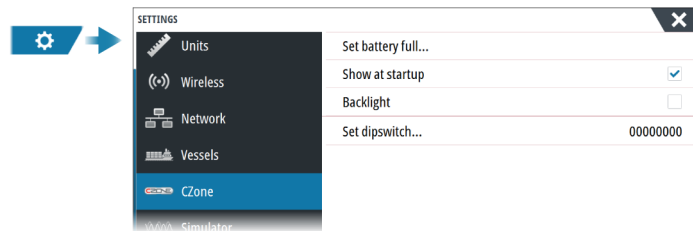
The CZone / NMEA 2000 Network interface bridge isolates the power of the two networks, but allows data to be freely shared between both sides.

The Interface Bridge can also be used for expansion of the NMEA 2000 network, when the maximum node limit (node = any device connected to network) for the network has been reached or the maximum cable length of 150 m will be exceeded. Once an Interface Bridge has been fitted, a further 40 nodes and additional cable length can be added.

The Network Interface is available from your BEP dealer.



#### CZone setup



In order to communicate with the CZone modules connected to the network, the unit must be assigned a unique CZone Display Dipswitch setting.

The functionality of the CZone system is determined by the CZone Config File which is stored on all CZone modules and the NSO evo3S. The file is created using the CZone Configuration Tool, a specialized PC application available from BEP Marine Ltd, and associated CZone distributors.

For more information, refer to the documentation provided with your CZone system.

#### Assigning the dipswitch setting

Every product capable of controlling and viewing CZone devices must be assigned a virtual dipswitch setting. This setting is unique for each device. Typically it is set after the configuration file already exists on the CZone system, but it may also be set in advance. To do so, access the CZone menu on the Settings page.

When the configuration is already available on the network, it will immediately commence uploading to the NSO evo3S once the dipswitch is set. Allow this to complete, without interruption.

#### Setting CZone to display at startup

With this option selected, the CZone control page is shown first, every time the NSO evo3S is powered up.

#### Backlight

Enabling this causes the NSO evo3S to synchronize its backlight setting with that of any CZone Display Interfaces set up to share backlight settings.

→ **Note:** CZone Config also needs to have the NSO evo3S set as a controller.

## Naviop

If this device is on the same NMEA 2000 network as a Naviop Loop system, this device can be used to operate the Naviop Loop system.

For details, refer to the documentation following the Naviop system.

## Mercury

If the unit is on the same NMEA 2000 network as a compatible Mercury Marine VesselView product or VesselView Link, specific features are automatically unlocked on the unit. When the features are enabled, the display may prompt the user for some basic configuration information. Refer to the VesselView® manual or engine supplier for further information.

## Suzuki Marine

If the unit is on the same NMEA 2000 network as a Suzuki C10 color gauge, a dedicated Suzuki instrument panel is unlocked and automatically enabled. Data source selection is done the same way as for any regular NMEA 2000 sources.

## Yamaha engine integration

If a compatible Yamaha gateway is connected to the NMEA 2000 network, a Yamaha engine icon is added to the Home page.

For more information about configuration information, the Yamaha panel and the data displayed, and Troll control, refer to the Yamaha manual or the engine supplier.

## Evinrude engine integration

If an Evinrude engine control head is available on the NMEA 2000 network, the Evinrude engines can be monitored and controlled from the unit.

When the feature is also enabled in the advanced settings features dialog:

- An Evinrude icon is added to the home page - select it to display the engine instrument panel.
- An Evinrude settings dialog is added - use this dialog to change engine settings.
- An Evinrude button is added to the control bar - selecting this button opens the engine controller. Use the engine controller to control the engines.

A maximum of two control heads and four engines is supported.

For more information, refer to the engine manual or engine supplier.

## Power-Pole

### Power-Pole anchors

This device can interface with the Power-Pole anchors via Bluetooth.

When the anchor(s) are paired with this device, the Power-Pole button is added to the control bar.

For more information about Bluetooth pairing and Power-Pole anchor operation, refer to the Operator manual.

### Power-Pole Charge module

This device can interface with the Power-Pole Charge module via the C-Monster gateway. Only one gateway can work on the NMEA 2000 network at a time.

When valid data is received from the gateway, the Charge button is added to the control bar.

For more information about the battery charge functionality, refer to the Operator manual.

For installation, wiring and setup information, refer to the Power-Pole documentation supplied with the Charge module.

## FLIR camera setup

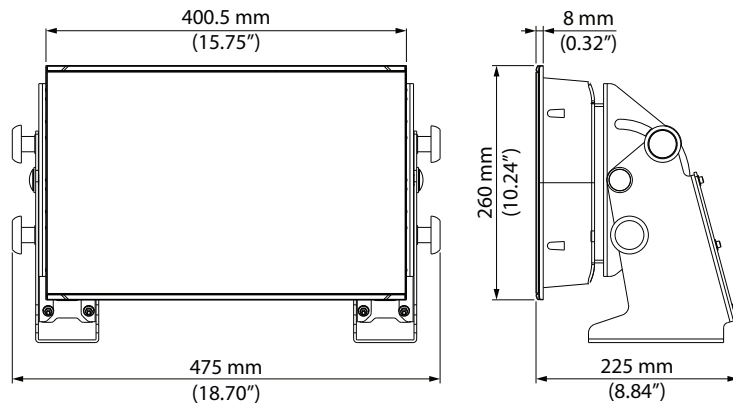
Compatible FLIR cameras are plug and play when used in conjunction with a device acting as a DHCP host. For setup on networks not utilizing a DHCP host, refer to the website or contact technical support.

# 6

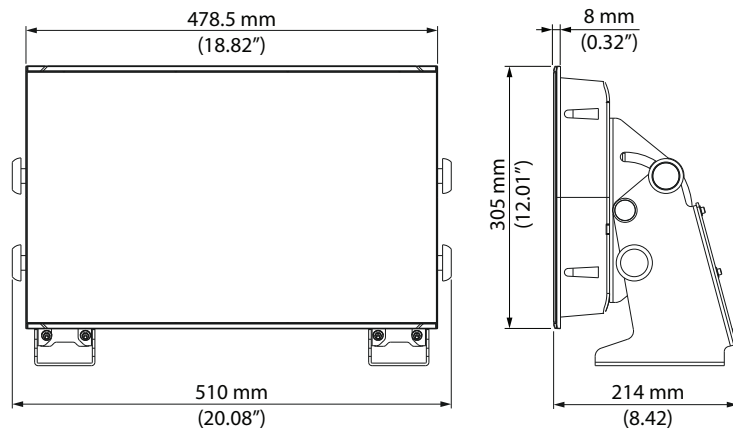
## Appendix

### Dimensional drawings

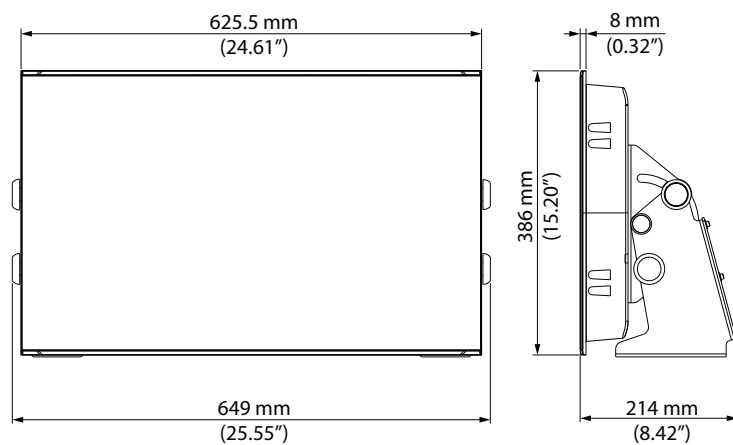
16"



19"



24"



## Technical specifications

### NSO evo3S

<b>Display</b>	
<b>Resolution</b>	1920 x 1080
<b>Brightness</b>	1000 nits
<b>Touch screen</b>	Full touch screen (multi-touch)
<b>Viewing angles in degrees</b> (typical value at contrast ratio = 10)	80° top/bottom, 80° left/right
<b>Electrical</b>	
<b>Supply voltage</b>	12/24 V DC (10 - 31.2 V DC min - max)
<b>Power consumption - Max</b>	
16" unit	40 W +- 4 W
19" unit	50 W +- 4 W
24" unit	80 W +- 5 W
<b>Recommended fuse rating</b>	
16" unit	6 A at 12 V DC / 3 A at 24 V DC
19" unit	7 A at 12 V DC / 4 A at 24 V DC
24" unit	10 A at 12 V DC / 5 A at 24 V DC
<b>Environmental</b>	
<b>Operating temperature range</b>	-15°C to +55°C (5°F to 131°F)
<b>Storage temperature</b>	-20°C to +60°C (4°F to 140°F)
<b>Waterproof rating</b>	IPX6 (when panel mounted correctly with only the front exposed)
<b>Humidity</b>	IEC 60945 Damp heat 66°C (150°F) at 95% relative (48 hr)
<b>Shock and vibration</b>	100 000 cycles of 20 G
<b>Interface/Connectivity</b>	
<b>Ethernet</b>	3x (RJ45)
<b>USB</b>	3x (USB-A)
<b>J1393</b>	1x (Micro-C)
<b>NMEA 2000</b>	1x (Micro-C)
<b>NMEA 0183</b>	4 ports
<b>Video output</b>	1x high definition video output (1080p, no HDCP, HDMI-A)
<b>Video input</b>	2x composite video (BNC) 1x high definition video (1080p, HDCP 1.4, HDMI-A)
<b>Data card reader</b>	1x slot (microSD)
<b>Wireless</b>	Internal 802.11b/g/n
<b>Physical</b>	
<b>Dimensions (W x H x D)</b>	Refer to "Dimensional drawings" on page 39
<b>Weight (display only)</b>	
16" unit	3.9 kg (8.6 lbs.)
19" unit	4.8 kg (10.5 lbs.)
24" unit	7.8 kg (17.2lbs.)
<b>Compass Safe Distance - Metric, imperial</b>	50 cm
<b>Mounting type</b>	Panel mount or bracket (optional accessory)

## Supported data

### NMEA 2000 compliant PGN List

#### *NMEA 2000 PGN (receive)*

59392	ISO Acknowledgement
59904	ISO Request
60160	ISO Transport Protocol, Data Transfer
60416	ISO Transport Protocol, Connection M.
65240	ISO Commanded Address
60928	ISO Address Claim
126208	ISO Command Group Function
126992	System Time
126996	Product Info
126998	Configuration Information
127237	Heading/Track Control
127245	Rudder
127250	Vessel Heading
127251	Rate of Turn
127252	Heave
127257	Attitude
127258	Magnetic Variation
127488	Engine Parameters, Rapid Update
127489	Engine Parameters, Dynamic
127493	Transmission Parameters, Dynamic
127500	Load Controller Connection State / Control
127501	Binary Status Report
127503	AC input status
127504	AC Output Status
127505	Fluid Level
127506	DC Detailed Status
127507	Charger Status
127508	Battery Status
127509	Inverter Status
128259	Speed, Water referenced
128267	Water Depth
128275	Distance Log
129025	Position, Rapid Update
129026	COG & SOG, Rapid Update
129029	GNSS Position Data
129033	Time & Date
129038	AIS Class A Position Report
129039	AIS Class B Position Report
129040	AIS Class B Extended Position Report
129041	AIS aids to Navigation
129283	Cross Track Error



129284	Navigation Data
129539	GNSS DOPs
129540	AIS Class B Extended Position Report
129545	GNSS RAIM Output
129549	DGNSS Corrections
129551	GNSS Differential Correction Receiver Signal
129793	AIS UTC and Date Report
129794	AIS aids to Navigation
129798	AIS SAR Aircraft Position Report
129801	Cross Track Error
129802	AIS Safety Related Broadcast Message
129283	Cross Track Error
129284	Navigation Data
129539	GNSS DOPs
129540	GNSS Sats in View
129794	AIS Class A Static and Voyage Related Data
129801	AIS Addressed Safety Related Message
129802	AIS Safety Related Broadcast Message
129808	DSC Call Information
129809	AIS Class B "CS" Static Data Report, Part A
129810	AIS Class B "CS" Static Data Report, Part B
130060	Label
130074	Route and WP Service - WP List - WP Name & Position
130306	Wind Data
130310	Environmental Parameters
130311	Environmental Parameters
130312	Temperature
130313	Humidity
130314	Actual Pressure
130316	Temperature, Extended Range
130569	Entertainment - Current File and Status
130570	Entertainment - Library Data File
130571	Entertainment - Library Data Group
130572	Entertainment - Library Data Search
130573	Entertainment - Supported Source Data
130574	Entertainment - Supported Zone Data
130576	Small Craft Status
130577	Direction Data
130578	Vessel Speed Components
130579	Entertainment - System Configuration Status
130580	Entertainment - System Configuration Status
130581	Entertainment - Zone Configuration Status
130582	Entertainment - Zone Volume Status
130583	Entertainment - Available Audio EQ Presets
130584	Entertainment - Bluetooth Devices
130585	Entertainment - Bluetooth Source Status

**NMEA 2000 PGN (transmit)**

60160	ISO Transport Protocol, Data Transfer
60416	ISO Transport Protocol, Connection M.
126208	ISO Command Group Function
126992	System Time
126993	Heartbeat
126996	Product Info
127237	Heading/Track Control
127250	Vessel Heading
127258	Magnetic Variation
127502	Switch Bank Control
128259	Speed, Water referenced
128267	Water Depth
128275	Distance Log
129025	Position, Rapid Update
129026	COG & SOG, Rapid Update
129029	GNSS Position Data
129283	Cross Track Error
129285	Navigation - Route/WP Information
129284	Navigation Data
129285	Route/Waypoint Data
129539	GNSS DOPs
129540	GNSS Sats in View
130074	Route and WP Service - WP List - WP Name & Position
130306	Wind Data
130310	Environmental Parameters
130311	Environmental Parameters
130312	Temperature
130577	Direction Data
130578	Vessel Speed Components

## NMEA 0183 supported sentences

### ***TX/RX - GPS***

Name	Description	RX	TX
DTM	Datum reference	x	
GGA	Global positioning system (GPS) fix data	x	x
GLC	Geographic position - Loran-C		
GLL	Geographic position - Latitude/longitude	x	x
GSA	GNSS DOP and active satellites	x	x
GNS	GNSS fix data	x	
GSV	GNSS satellites in view	x	x
VTG	Course over ground and ground speed	x	x
ZDA	Time and date	x	x

### ***TX/RX - Navigation***

Name	Description	RX	TX
AAM	Waypoint arrival alarm		x
APB	Heading/track controller (autopilot) sentence B		x
BOD	Bearing origin to destination		x
BWC	Bearing and distance to waypoint - Great circle		x
BWR	Bearing and distance to waypoint - Rhumb line		x
RMB	Recommended minimum navigation information		x
XTE	Cross-track error - measured		x
RTE	Routes	x	
WPL	Waypoint location	x	

### ***TX/RX - Sonar***

	RX	TX
DBT	x	x
DPT	x	x
MTW	x	x
VLW	x	x
VHW	x	x

### ***TX/RX - Compass***

Name	Description	RX	TX
HDG	Heading, deviation and variation	x	x
HDT	Heading true	x	
THS	True heading and status	x	x
ROT	Rate of turn	x	

### **TX / RX - Wind**

	<b>RX</b>	<b>TX</b>
MWD	x	x
MWW	x	x

### **TX / RX - AIS / DSC**

<b>Name</b>	<b>Description</b>	<b>RX</b>	<b>TX</b>
DSC	Digital selective calling information	x	
DSE	Expanded digital selective calling	x	
VDM	AIS VHF data-link message	x	
VDO	AIS VHF data-link own-vessel report	x	

→ **Note:** AIS sentences are not bridged to or from NMEA 2000.

### **TX / RX - MARPA**

	<b>RX</b>	<b>TX</b>
TTL		x
TTM		x

→ **Note:** These are only output sentences.

## PGN/SPN list

J1939 SPN/PGN	Description	NMEA2000 PGN
190 / 61444	Engine Speed	127488
102 / 65270	Engine Turbocharger Boost Pressure	127488
100 / 65263	Engine Oil Pressure	127489
175 / 65262	Engine Oil Temperature 1	127489
110 / 65262	Engine Coolant Temperature	127489
167 / 65271	Alternator Potential (Voltage)	127489
183 / 65266	Engine Fuel Rate	127489
247 / 65253	Engine Total Hours of Operation	127489
109 / 65263	Engine Coolant Pressure	127489
94 / 65263	Engine Fuel Delivery Pressure	127489
92 / 61443	Engine Percent Load at Current Speed	127489
513 / 61444	Actual Engine - Percent Torque	127489
189 / 65214	Engine Rated Speed	127498
237 / 65260	Vehicle Identification Number	127498
234 / 65242	Software Identification	127498
523 / 61445	Transmission Current Gear	127493
127 / 65272	Transmission Oil Pressure	127493
177 / 65272	Transmission Oil Temperature	127493

- **Note:** The unit will act as a gateway and resend received J1939 PGN/SPN over NMEA 2000.
- **Note:** Some data are only sent when requested, refer to "*J1939 settings*" on page 35. For communication details refer to the engine manufacturer.



# NSO evo3S

# Operator Manual

ENGLISH



# Preface

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## Disclaimer

As Navico is continuously improving this product, we retain the right to make changes to the product at any time which may not be reflected in this version of the manual. Please contact your nearest distributor if you require any further assistance.

It is the owner's sole responsibility to install and use the equipment in a manner that will not cause accidents, personal injury or property damage. The user of this product is solely responsible for observing maritime safety practices.

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This manual represents the product as at the time of printing. Navico Holding AS and its subsidiaries, branches and affiliates reserve the right to make changes to specifications without notice.

## Governing language

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## Navico product references

This manual refers to the following Navico products:

- Broadband Radar<sup>™</sup> (Broadband Radar)
- Broadband 3G<sup>™</sup> (Broadband 3G Radar)
- Broadband 4G<sup>™</sup> (Broadband 4G Radar)

- Broadband Sounder™ (Broadband Sounder)
- DownScan Imaging™ (DownScan)
- DownScan Overlay™ (Overlay)
- FishReveal™ (FishReveal)
- ForwardScan™ (ForwardScan)
- GoFree™ (GoFree)
- Genesis® (Genesis)
- Halo™ Pulse Compression Radar (Halo Radar)
- StructureMap™ (StructureMap)

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## Compliance statements

### Europe

Navico declare under our sole responsibility that the product conforms with the requirements of:

- CE under RED 2014/53/EU

The relevant declaration of conformity is available in the product's section at the following website:

### ***Countries of intended use in the EU***

AT - Austria	LI - Liechtenstein
BE - Belgium	LT - Lithuania
BG - Bulgaria	LU - Luxembourg
CY - Cyprus	MT - Malta
CZ - Czech Republic	NL - Netherlands
DK - Denmark	NO - Norway
EE - Estonia	PL - Poland
FI - Finland	PT - Portugal
FR - France	RO - Romania
DE - Germany	SK - Slovak Republic
GR - Greece	SI - Slovenia
HU - Hungary	ES - Spain
IS - Iceland	SE - Sweden
IE - Ireland	CH - Switzerland
IT - Italy	TR - Turkey
LV - Latvia	UK - United Kingdom

### **United States of America**

Navico declare under our sole responsibility that the product conforms with the requirements of:

- Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation



**⚠ Warning:** The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

→ **Note:** This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that of the receiver is connected
- Consult the dealer or an experienced technician for help

### **ISED Canada**

This device complies with ISED (Innovation, Science and Economic Development) Canada's license-exempt RSSs. Operation is subject to the following two conditions: (1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device.

La traduction française de ce document est disponible sur le site Web du produit.

### **Australia and New Zealand**

Navico declare under our sole responsibility that the product conforms with the requirements of:

- level 2 devices of the Radiocommunications (Electromagnetic Compatibility) standard 2017
- radiocommunications (Short Range Devices) Standards 2014

## **About this manual**

This manual is a reference guide for operating the unit. It assumes that all equipment is installed and configured, and that the system is ready to use.

Images used in this manual might not exactly match the screen on your unit.

### **Important text conventions**

Important text that requires special attention from the reader is emphasized as follows:

→ **Note:** Used to draw the reader's attention to a comment or some important information.

**⚠ Warning:** Used when it is necessary to warn personnel that they should proceed carefully to prevent risk of injury and/or damage to equipment/personnel.

### **Manual version**

This manual is written for software version 19.3. The manual is continually updated to match new software releases.

### **Translated manuals**

Available translated versions of this manual can be found on the following website:

## Viewing the manual on the screen

The PDF viewer included in the unit makes it possible to read the manuals and other PDF files on the screen.

The manuals can be read from a storage device connected to the unit or copied to the unit's internal memory.



## Device registration

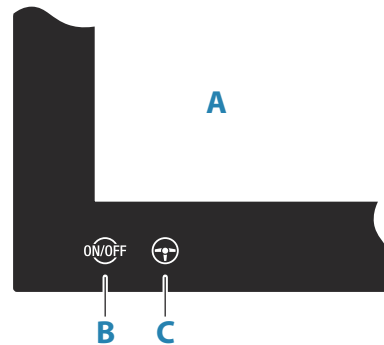
You are prompted to register your device during startup. You can also register by selecting the register option in the System settings dialog. Registration can be done:

- From the device if it is connected to the internet
- From a smart device with internet access
- Over the phone

# 1

## Introduction

### Front controls



**A Touch screen**

**B Power key**

- Press and hold: turns the unit ON/OFF
- Short press once: displays the System Controls dialog
- Repeat short presses: toggles through preset dimming levels

**C WheelKey** - user configurable key, refer to "*Configurable WheelKey*" on page 18.

Default without an autopilot connected to the system

- Short press: toggles between panels on split screen
- Long press: maximizes active panel on split screen

Default with an autopilot connected to the system

- Short press: opens the autopilot controller and puts the autopilot in standby mode
- Long press: toggles between panels on split screen

### Home page

The Home page is accessed from any operation by selecting the Home button.



**A** Settings button

**B** Toolbar

**C** Status bar

**D** Application page buttons

**E** Bridge Control

**F** Close button, closes the current panel.

**G** Power button

**H** Favorites bar

## I Man Over Board (MOB) button

### **Settings button**

Select to access application and feature settings dialogs. These dialogs are used to configure the feature during installation and for making user settings. The settings dialogs are explained toward the end of each application chapter.

### **Toolbar buttons**

Provide access to options and tools that are not specific to any panel. For toolbar button explanations, refer to *"Tools and settings"* on page 133.

### **Status bar**

Shows the status of the system. For definitions of status bar icons, refer to *"Status bar icon definitions"* on page 150.

### **Application buttons**

Select an application button to open it. The application buttons that appear on the home page depend on what applications are setup in your system.

Press and hold an application button to display predefined split pages for the application. Select a predefined split page button to open the split page.

### **Bridge control**

Swipe down on the home page to access the Bridge control feature. The Bridge Control feature allows you to control which pages are shown on several displays at the same time. For more information, refer to *"Bridge Control"* on page 21.

### **Power button**

Opens the System Control dialog. The System Controls dialog provides quick access to basic system settings. Refer to *"System controls dialog"* on page 16.

### **Favorites bar**

The favorites bar lists preconfigured pages and favorite pages you have made. Select a favorite page button to open the page.

Favorite pages can be single or multiple-panel pages. The unit display size determines the number of application panels that can be included on a favorite page.

The favorites bar also provides favorite page editing tools. All favorite pages can be modified. For information how to add and modify favorite pages, refer to *"Customizing favorite pages"* on page 19.

### ***Favorite bar as pop-up on a page***

The favorite bar can be displayed on any application page by:

- Pressing and holding the Home button
- Pressing and holding the Pages key on a remote controller
- Simultaneously pressing the Ctrl and semicolon (;) keys on a keyboard

### **Man Overboard waypoint**

If an emergency situation should occur, you can save a Man Overboard (MOB) waypoint at the vessel's current position.

### ***Create a MOB***

To create a Man Overboard (MOB) waypoint:

- Select the MOB button on the Home page
- Press the MOB key on a remote controller
- Press and hold the F12 key on a keyboard

When you activate the MOB function, the following actions are automatically performed:

- A MOB waypoint is created at the vessel's position
- The display switches to a zoomed chart panel, centered on the vessel's position
- The system displays navigation information back to the MOB waypoint

Multiple MOB waypoints can be created. The vessel continues to show navigation information to the initial MOB waypoint. Navigation to subsequent MOB waypoints needs to be done manually.

**Delete a MOB**

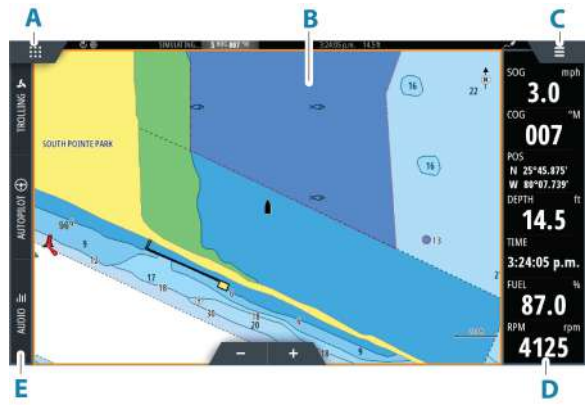
A MOB waypoint can be deleted from the menu when the MOB is activated.

**Stop navigating to MOB**

The system continues to display navigational information towards the MOB waypoint until you cancel the navigation from the menu.



**Application pages**



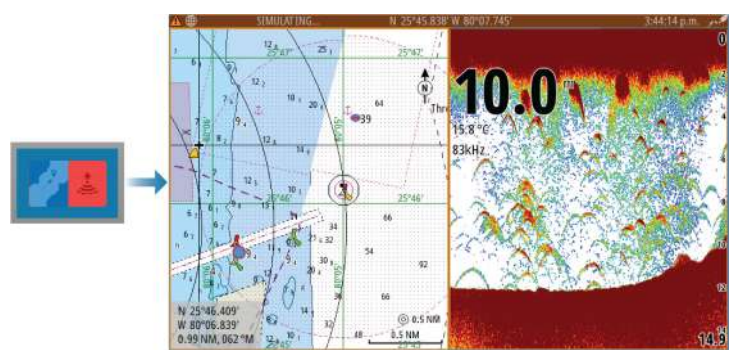
- A** Home/pages button
- B** Application panel
- C** Menu button
- D** Instrument bar
- E** Control bar

**Application panels**

An application panel shows the application and provides a menu with customize options. The application panels and the menu options are further explained in each application chapter in this manual.

**Predefined split pages**

A predefined split page shows more than one application page on a panel. You can adjust the split on a predefined split page. Refer to "Adjusting the split on multiple panel pages" on page 20.



## Menu button

Displays the menu of the active panel. Use menu options to customize the image. The panel menu options are further explained later in this manual in each application chapter.

## Instrument bar

The instrument bar displays information from sensors connected to the system.

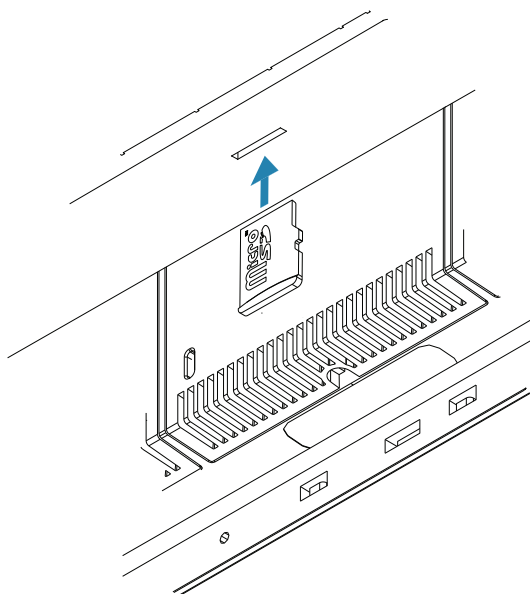
By default, the instrument bar is shown on the panel. You can turn the instrument bar off.

You can select the predefined bar to be shown and you can change the information displayed in the predefined bar. Refer to "*Customizing the instrument bar*" on page 19.

## Control bar

The control bar contains buttons for launching controllers or features enabled in your system. The different controllers are described in applicable chapters later in the manual.

## Card reader



A memory card can be used for:

- Chart data
- Software updates
- Transfer of user data
- System backup

→ **Note:** Do not download, transfer or copy files to a chart card. Doing so can damage chart information on the chart card.

## USB port

The USB port can be used to:

- connect a keyboard
- connect a mouse
- connect a storage device
- connect a card reader

→ **Note:** If you want to read chart cards using a USB card reader connected to the USB port, an MI10 USB card reader is required.

The USB devices should be standard PC compatible hardware.

→ **Note:** USB cable length should not exceed 5 m when using regular cables. Lengths over 5 m may be possible with the use of an active USB cable.

# 2

## Basic operation

---

### Turning the system on and off

The system is turned on by pressing the Power key.

Press and hold the Power key to turn the unit off.

If the key is released before the shut-down is completed, the power off process is cancelled.

You can also turn the unit off from the System Controls dialog.

### First time startup

When the unit is started for the first time, or after a reset, the unit displays a series of dialogs. Respond to the dialog prompts to make fundamental settings.

You can perform further setup and later change settings using the system settings dialogs.

### Standby mode

In Standby mode, the backlight for screen and keys are turned off to save power. The system continues to run in the background.

You select Standby mode from the System Controls dialog.

Switch from Standby mode to normal operation by a short press on the Power key.

### Touchscreen, keyboard and mouse operation

For touchscreen, keyboard and mouse operation details, refer to the "Appendix" on page 148.

### Remote controllers

You can connect a remote controller to the network and remotely control the unit.

A separate manual is included with the remote controller.

### System controls dialog

The System Controls dialog provides quick access to basic system settings.

The buttons displayed on the dialog vary with operational mode and connected equipment.

For those functions that toggle on and off, a highlighted button indicates the function is activated.

Display the dialog by:

- pressing the power key
- selecting the power button from the home page
- swiping down from the top of the screen on application pages



### Activating functions

Select the button of the function you want to open, set or toggle on or off. For those functions that toggle on and off, a highlighted button indicates the function is activated.

## **Standby mode**

In Standby mode, the backlight for screen and keys are turned off to save power. The system continues to run in the background.

You select Standby mode from the System Controls dialog.

Switch from Standby mode to normal operation by a short press on the Power key.

## **Display illumination**

### ***Brightness***

You can cycle the preset backlight levels by short presses on the Power key.

The display backlighting can also be adjusted from the System Controls dialog.

### ***Night mode***

The night mode can be activated from the System Controls dialog.

The night mode option optimizes the color palette for low light conditions.

## **Locking the touchscreen**

You can temporarily lock a touch screen to prevent accidental operation of the system.

You can only lock the touch screen if there is a remote controller with a power key connected to the NMEA 2000 network. This will prevent permanent lock-out.

You lock the touch screen from the System Controls dialog.

When the touch lock is active, you can still operate the unit from the remote controller.

You remove the lock function by pressing the power key on the remote controller.

## **Instrument bar**

Toggles the Instrument bar on/off for the current page only.

## **Screen capture**

You enable/disable the screen capture option in the system settings dialog.

To take a screen capture:

- Tap the status bar or the dialog title
- Keyboard operation: press the PrintScr key or press Ctrl + \

Screen captures are saved to internal memory.



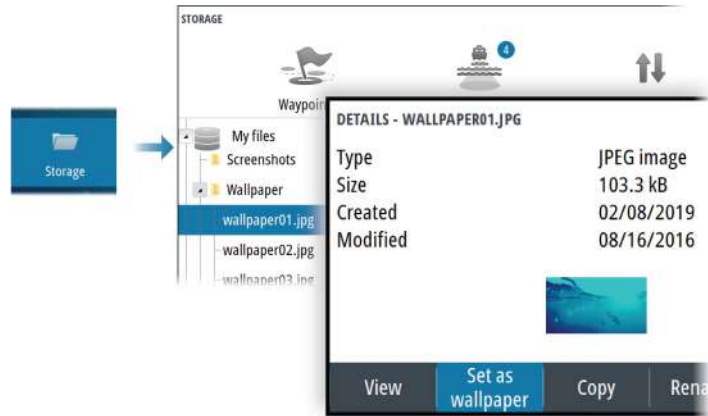
# 3

## Customizing your system

### Customizing the Home page wallpaper

The Home page's wallpaper can be customized. You can select one of the pictures included with the system, or you can use your own picture in .jpg or .png format.

The images can be available on any location that can be seen in the storage browser. When a picture is chosen as the wallpaper, it is automatically copied to the Wallpaper folder.



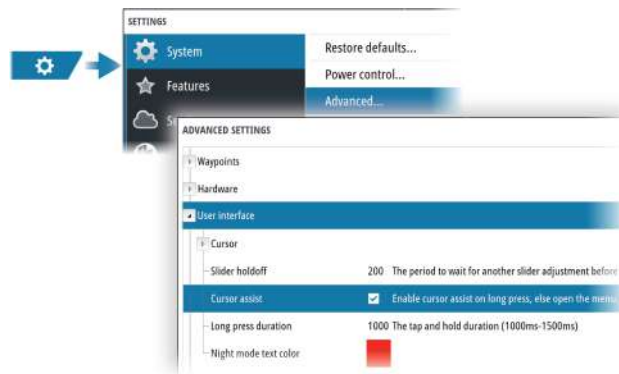
### Configurable WheelKey

Configures the action of the WheelKey on the front of the unit.

To configure the Wheel key, select Configure WheelKey on the System Setting dialog.

### Customizing the long press feature

You can specify if the long press on the panel opens the menu or displays the cursor assist feature on the panel.



### Multiple panel pages

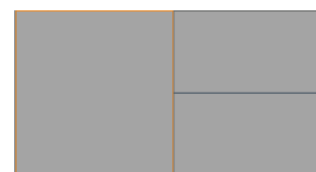
Panel sizes in a multiple panel page can be adjusted from the System Controls dialog. Refer to *"Adjusting the split on multiple panel pages"* on page 20.

In a multiple panel page, only one panel can be active at a time. The active panel is outlined with a border.

You can only access the menu of an active panel.



2 panels page



3 panels page

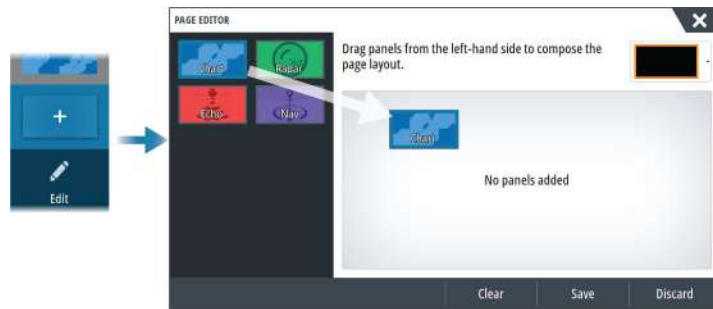
## The shadow cursor on a multiple panel page

When using the cursor on a sonar (sonar, DownScan, or SideScan) image on a multiple panel page, the cursor is shadowed on the other sonar (sonar, DownScan, and SideScan), chart and radar panels.

## Customizing favorite pages

### Adding new favorite pages

→ **Note:** The unit display size determines the number of favorite pages allowed and the number of application panels that can be included on a favorite page.



### Edit favorite pages

Select the edit button in the favorite panel and then:

- Select the X icon on a favorite button to remove the page
- Select the tool icon on a favorite button to display the page editor dialog



## Customizing the instrument bar

→ **Note:** You must activate the instrument bar in the application to access the instrument bar menu.

### Turning the instrument bar ON or OFF

By default, the Instrument bar is shown on the panel.

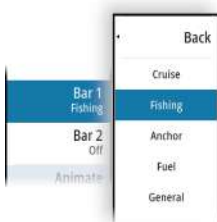
You can turn the instrument bar ON/OFF from the System Controls dialog.

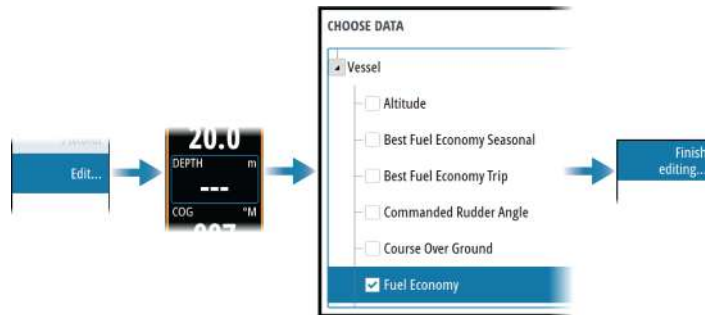
### Select a predefined instrument bar

Use the menu to select a predefined activity based instrument bar.

### Changing data

You can change data from the menu.



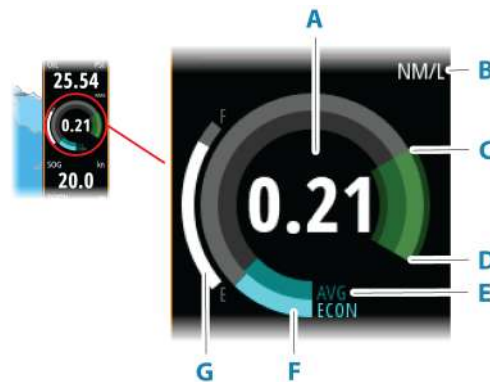


### Reset the instrument bar

You can reset the instrument bar from the edit menu option to show the predefined default gauges.

### Fuel economy gauge

You can display a fuel economy gauge in the instrument bar on application pages. Select the predefined Fuel activity bar or change a gauge source to the Fuel Economy option found in the Vessel category of the choose data dialog.



- A** Digital readout of current economy
- B** Fuel economy measurement units
- C** 100% efficiency, this equates to the 'nominal consumption'
- D** 120% efficiency
- E** Average fuel economy
- F** Instantaneous economy
- G** Current fuel level

The fuel economy gauge displays the instantaneous versus historical average fuel efficiency. The start of the green zone represents 'Nominal Fuel Economy', and it displays an additional 20% area to allow your fuel efficiency to be displayed above the nominal fuel economy.

The more efficient you consume fuel, the more the outer blue dial creeps up towards the green portion of the scale. If you achieve the nominal efficiency of your vessel you will be at the green zone. If you manage to achieve an efficiency better than your nominal efficiency, you will be somewhere in the upper green zone.

Nominal fuel economy can be entered in the Vessel Setup dialog displayed from the Fuel settings dialog.

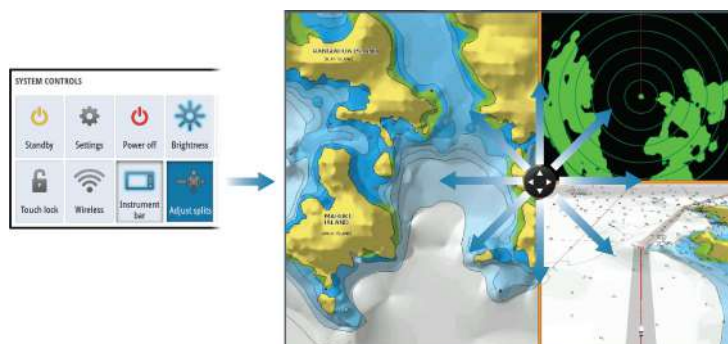
You can reset your average fuel economy from the Reset Fuel Economy button on the Fuel settings dialog. When you reset it, the system starts calculating the new average.

Set the measurement units for the fuel economy gauge in the Economy field in the Units settings dialog.

## Adjusting the split on multiple panel pages

1. Open the multiple panel page

2. Open the System Controls dialog
3. Select the adjust splits option. The adjustment icon appears on the multiple panel page.
4. Select the adjustment icon and move the split to the desired position
5. Use menu options to save or discard your changes.



## Enabling or disabling features

A compatible device connected to the unit should automatically be identified by the system. If not, enable the feature from the advanced settings dialog.



## Password Protection

You can set a PIN code to prevent unauthorized access to your system's settings. Refer to "PIN code" on page 134.

## Feature unlock

Some additional features can be sold separately. These features can be unlocked by entering an unlock code.

Select the feature you want to unlock. Follow the instructions to purchase and enter the feature unlock code.

After a feature unlock code is entered in the unit, the feature is available for use.

→ **Note:** The feature unlock option is only available if your unit supports a locked feature.



## Bridge Control

### About Bridge Control

The Bridge Control feature allows you to control which pages are shown on several displays at the same time. The feature is used on vessels with multiple displays mounted in the same place to quickly configure what information is displayed.

There can be a maximum of four different bridges on your system, and you can have up to four displays grouped into one bridge. Each display can be configured to only one bridge.

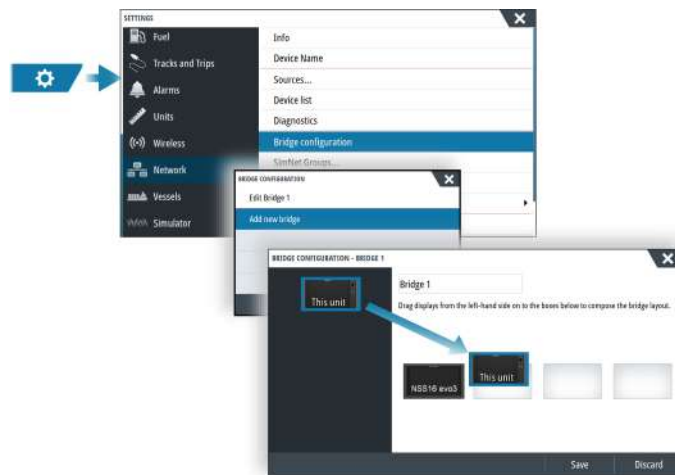
When the displays are included in a bridge, you can configure twelve page configurations (presets) for each bridge.

## Adding displays to a Bridge

→ **Note:** All displays must be turned on to be available for bridge configuration.

1. Open the Bridge Configuration dialog
2. Select to configure a new bridge or to edit an existing
  - The Bridge Configuration for the selected bridge will be shown, and all displays that are not already assigned to a bridge will be listed
3. Select the display you want to add to the bridge
  - Arrange the displays from left to right in the same physical layout as the displays on your current bridge/dashboard/helm
4. Rename the bridge if required
5. Save the configuration

The Bridge Control button will be displayed on the home page of all displays that are configured for a bridge.



## Configuring the preset pages for displays in a bridge

1. Activate the Bridge Control panel by swiping down on the home page.
2. To add a new bridge page, select the add icon. To edit an existing page, select the edit icon.
3. Select the display for which you want to define the preset page.
  - The page layout option for the selected display will be read from the network, showing main features and configured favorite pages.
4. Select the preferred page.
  - Select the blank page if you do not want that display to be included in the selected bridge preset.
5. Repeat step 3 and 4 until a page is configured for all displays in all bridge presets.
6. Select the edit icon to leave the add or edit mode and to save your configuration.



## Selecting Bridge presets

You can display an overview of available bridge presets by opening the Bridge Control option on the home page.

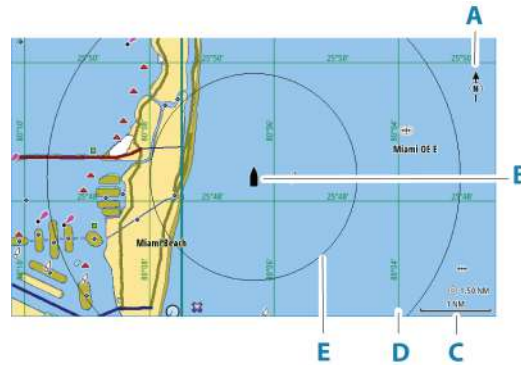
When you select one of the preset configurations all devices included in that bridge will switch to the pre-configured pages.



# 4

## Charts

### The Chart panel



- A** North indicator
- B** Vessel
- C** Chart range scale
- D** Grid lines\*
- E** Range rings\*

\* Optional chart items. Optional chart items can be turned on/off individually from the chart settings dialog.

### Chart data

The system can be delivered with preloaded cartography.

For a full selection of supported charts, visit the product web site.

→ **Note:** Chart menu options vary depending on the chart you are using.

Charts on chart cards are shared over the Ethernet network, so only one chart card per vessel is required.

→ **Note:** The system does not automatically switch to preloaded cartography if the chart card is removed. A low-resolution chart will be displayed until you re-insert the card or manually switch back to the preloaded cartography.

### Selecting chart source

Available chart sources are listed in the menu.

If you have identical chart sources available, the system automatically selects the chart with most chart details for your displayed region.

### Showing dual chart sources

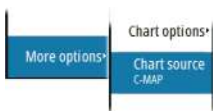
If you have different chart sources available, you can show two different chart sources simultaneously on a page that has two chart panels.

Activate each chart page and select its source in the menu.

### Vessel symbol

When the system has a valid GPS position lock, the vessel symbol indicates vessel position. If no GPS position is available, the vessel symbol includes a question mark.

If heading information is not available, the vessel icon orientates itself using COG (Course over Ground).



5.0 NM  
2 NM

## Zooming the chart

The chart range scale and range rings interval (when turned on) are shown on the chart panel. You change the scale by zooming the chart in or out.

## Panning the chart

You can move the chart in any direction by:

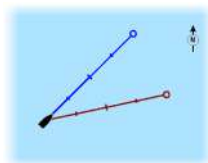
- Dragging the screen
- Move the cursor to the edge of the chart panel using the arrow keys

## Chart orientation

You can specify how the chart is rotated in the panel. The chart orientation symbol in the panel's upper right corner indicates the north direction.

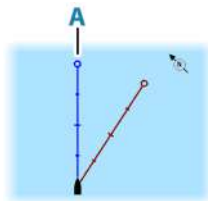


### North up



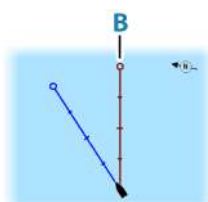
Displays the chart with north upward.

### Heading up



Displays the chart with the vessel's heading (**A**) directed upward. Heading information is received from a compass. If heading is not available, then the COG from the GPS is used.

### Course up



The chart direction is depending on if navigating or not:

- When navigating: the desired course line (**B**) is oriented up
- When not navigating: the direction the vessel is actually traveling (COG) is oriented up

## Look ahead

Moves the vessel icon on the panel to maximize your view ahead of the vessel.

## Displaying information about chart items

When you select a chart item, a waypoint, a route, or a target, basic information for the selected item is displayed. Select the chart item's pop-up to display all available information for that item. You can also activate the detailed information dialog from the menu.

→ **Note:** If you are viewing applicable C-MAP charts on your system, you can select marine objects to display information about services and available multimedia (photos) associated with the location or object.



→ **Note:** Pop-up information has to be enabled in chart settings to see basic item information.



## Using the cursor on the panel

By default, the cursor is not shown on the panel.

When you activate the cursor, the cursor position window is displayed. When the cursor is active, the panel does not pan or rotate to follow the vessel.



### Go to cursor

You can navigate to a selected position on the image by positioning the cursor on the panel, and then using the go to cursor menu option.

### The cursor assist function

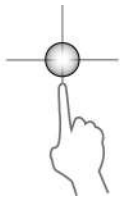
→ **Note:** The cursor assist function is available if it is enabled. Refer to "*Customizing the long press feature*" on page 18.

The cursor assist function allows for fine tuning and precision placement of the cursor without covering details with your finger.

Activate the cursor on the panel, then press and hold your finger on the screen to switch the cursor symbol to a selection circle, appearing above your finger.

Without removing your finger from the screen, drag the selection circle to the desired position.

When you remove your finger from the screen the cursor reverts to normal cursor operation.



## Measuring distance

The cursor can be used to measure the distance between your vessel and a selected position, or between 2 points on the chart panel.

1. Position the cursor on the point where you want to measure the distance to. Start the measure function from the menu
  - The measuring icons appear with a line drawn from the vessel center to the cursor position, and the distance is listed in the cursor information window.
2. The measuring points can be repositioned by dragging either icon while the measuring function is active.

→ **Note:** The bearing is always measured from the grey icon to the blue icon.

The start measuring function can also be started without an active cursor. Both measuring icons are then initially located at the vessel position. The grey icon follows the vessel as the vessel moves, while the blue icon remains at the position given when you activated the function. The measuring points can then be repositioned by dragging either icon.

Terminate the measuring function by selecting the finish measuring option.



## Creating routes on the chart panel

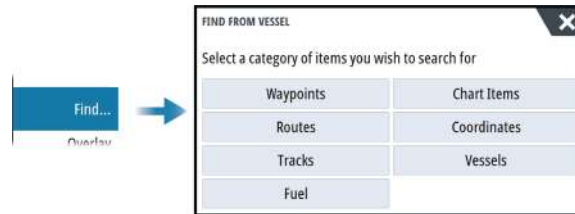
1. Activate the cursor on the chart panel
2. Select the new route option from the menu
3. Position the first waypoint on the chart panel

4. Continue positioning the remaining routepoints
5. Save the route by selecting the save option in the menu.

## Find objects on chart panels

You can search for other vessels or various chart items from a chart panel.

Activate the cursor on the panel to search from the cursor position. If the cursor is not active, the system searches for items from the vessel's position.



→ **Note:** You must have a SiriusXM Marine subscription to search for fueling stations.

→ **Note:** You must have an AIS receiver connected to search for vessels.

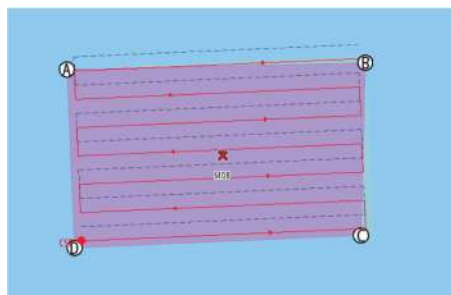
## Marine Search and Rescue (SAR) feature

The marine SAR feature creates a search pattern route in the form of a parallel or creeping line search pattern on the chart.

To use the feature it must be enabled in the advanced features dialog.



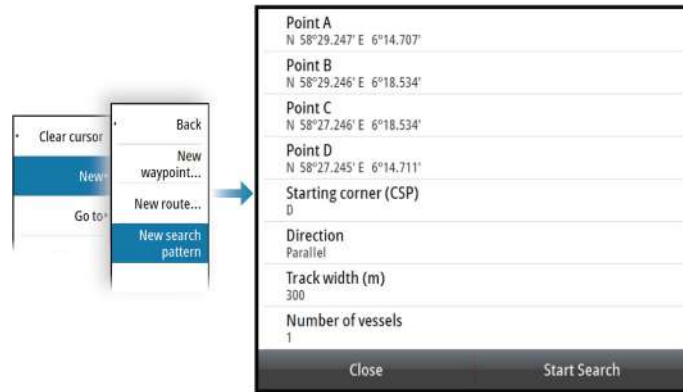
The following is an example of an SAR area on the chart.



The purple area is the area that is defined by you. The light orange shading is the area that is calculated by the system.

### Setting up the search area

Place the cursor on the chart in the location of Point A. Then use the New search pattern menu option to set up the search area. This option opens the SAR Edit dialog.



Define the four corners of the search area, by entering corner coordinates.  
The following settings must be defined:

- Track width - controls how much space is in between parallel legs (the legs with the longest length).
- Number of vessels - controls how many SAR routes are generated. An SAR route is created for each vessel. The first vessel will have a red route and the others will have a dashed black route. The space between each vessel is the track spacing distance.
- Direction - can be either Parallel or Creeping. Parallel direction makes the route move along the side with the longest length. Creeping is the opposite as it moves along the shortest side.
- Starting corner (CSP) - determines which corner you want to start from.

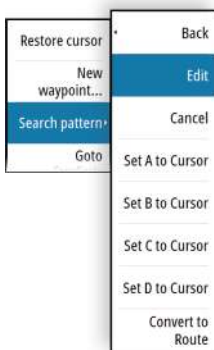
The system will calculate the number of legs and leg distances. It also calculates the Commence Start Position (CSP) as half the track spacing from the starting corner. The start heading is calculated as the heading parallel to the longest side of the search rectangle from the start position.

### Editing the search parameters

Use the Edit SAR dialog to alter search pattern parameters.

You can also change the 4 corners of the search area using the set to cursor menu options. Position the cursor on the chart and then select the appropriate set to cursor menu option.

→ **Note:** The Close option on the Edit SAR dialog saves changes and closes the dialog. It does not terminate the SAR.



### Detect participating vessels not on the search pattern

Turn on AIS targets and Radar overlay to see participating vessels that are not on their search pattern. Once identified, you can direct them back to the track.

### Terminating the SAR session

Use the Cancel Search pattern menu option to stop the search.

### Convert a SAR to a route

The Convert to route option allows you to name, edit, and save it to your route library.

## 3D charts

The 3D option provides a three dimensional graphical view of land and sea contours.

→ **Note:** All chart types work in 3D mode, but without 3D cartography for the appropriate area the chart appears flat.

When the 3D chart option is selected, the rotate (**A**) and the pan (**B**) icons appear on the chart panel.

### Panning the 3D chart

You can move the chart in any direction by selecting the Pan icon and then panning in the desired direction.



To return the chart to vessel position use the return to vessel option.

### Controlling the view angle

You can control the view angle by selecting the rotate icon, and then panning the chart panel.

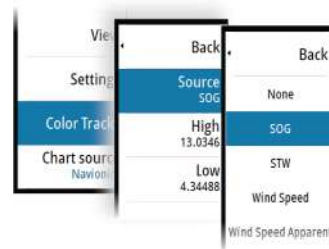
- To change the direction you are viewing, pan horizontally
- To change the tilt angle of the view, pan vertically

→ **Note:** When centered on the vessel position, only the tilt angle can be adjusted. The view direction is controlled by the chart orientation setting. Refer to "*Chart orientation*" on page 25.

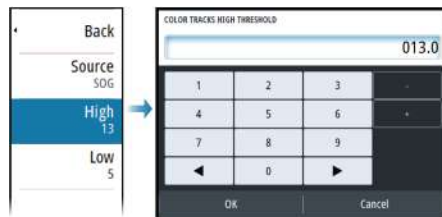
### Color tracks based on data

A track can be colored based on what source data and the high/low limits you set:

- You can specify the source (data type) to be colored. To turn off coloring, select source **None**.



- Select the high and low options to set high and low values.



The colors can be shades of green, yellow, and red. Green is for the high limit you set. Yellow is the value that is the average of the high and low. Red is for the low limit. If the value is between the high and the middle values, it appears as a greenish-yellow color. If the value is between the middle and the low, it appears as an orange color.

→ **Note:** By default tracks are colored according to the color setting in the Edit Track dialog. Coloring tracks based on source data overrides the coloring specified in the Edit Track dialog.

If two or more charts are displayed in a split panel, changing the color source or high/low values on one chart does not change the other charts.

### Chart overlay

You can add overlays on the chart panel.

When an overlay is selected, the chart menu expands to include basic menu options for the selected overlay.

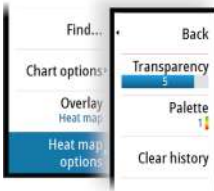
Information about the overlay menu options are described in more detail below or in their separate sections in this manual.

#### Heat map overlay

The Heat map overlay feature shows a history of water temperature coloring on the chart. A water temperature source is needed to provide the temperature data for the overlay.

The color range is adjusted automatically based on the minimum and maximum temperatures recorded.





### **Transparency**

Adjusts the transparency of the overlay. With a minimum transparency setting, the panel details are almost hidden by the overlay.

### **Palette**

Specifies the colors used to show water temperatures. A legend is shown on the panel that identifies the colors associated with the recorded temperatures.

### **Clear history**

Deletes all heat map data gathered up to the moment it is selected. Heat map data is automatically deleted when the unit is turned off.

## **C-MAP charts**

All possible menu options for C-MAP charts are described below. The features and menu options available can vary depending on the charts you use. This section shows menus from a C-MAP chart.

→ **Note:** A menu option is greyed out if the feature is not available on the chart displayed.

### **C-MAP tides and currents**

The system can display C-MAP tides and currents. With this information it is possible to predict the time, level, direction and strength of currents and tides. This is an important tool when considering planning and navigation of a trip.

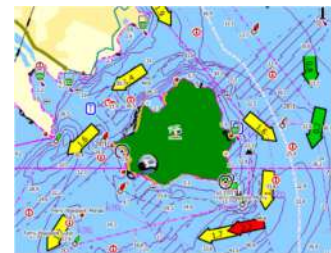
In large zoom ranges the tides and currents are displayed as a square icon including the letter **T** (Tides) or **C** (Current). When you select one of the icons, tidal or current information for that location are displayed.

Dynamic current data can be viewed by zooming inside a 1-nautical mile zoom range. At that range, the Current icon changes to an animated dynamic icon that shows the speed and direction of the current. Dynamic icons are colored in black (greater than 6 knots), red (greater than 2 knots and less than or equal to 6 knots), yellow (greater than 1 knot and less than or equal to 2 knots) or green (equal to or less than 1 knot), depending on the current in that location.

If there is no current (0 knots) this will be shown as a white, square icon.



*Static Current and Tide icons*

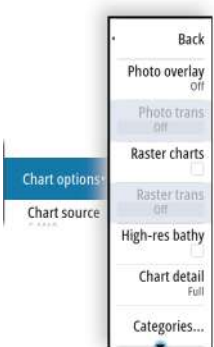


*Dynamic Current icons*

### **C-MAP specific chart options**

#### **Photo overlay**

Photo overlay enables you to view satellite photo images of an area as an overlay on the chart. The availability of such photos is limited to certain regions, and cartography versions. You can view photo overlays in either 2D or 3D modes.





*No Photo overlay*



*Photo overlay, land only*



*Full Photo overlay*

### Photo transparency

The Photo transparency sets the opaqueness of the photo overlay. With minimum transparency settings the chart details are almost hidden by the photo.



*Minimum transparency*



*Transparency at 80*

### **Raster charts**

Changes the view to that of a traditional paper chart.

### **Raster transparency**

Controls the transparency of raster imagery.

### **High resolution bathymetry**

Enables and disables higher concentration of contour lines.

### **Chart detail**

- Full - displays all available information for the chart in use.
- Medium - displays minimum information sufficient for navigation.
- Low - displays basic level of information that cannot be removed, and includes information that is required in all geographic areas. It is not intended to be sufficient for safe navigation.

### **Chart categories**

Several categories and sub-categories are included. You can turn on/off individually depending on which information you want to see.

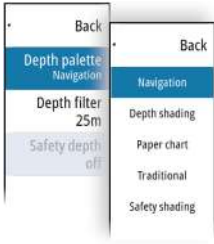
The categories listed in the dialog are dependent on the charts used.

### **Shaded relief**

Shades seabed terrain.

### **No contours**

Removes contour lines from the chart.



### Depth palette

Controls the Depth palette used on the map.

#### Navigation

Color shades depth areas based on depth range values set by the system. If the depth is within a certain range the system will select the exact color of that range. It colors darker shades of blue in shallower water and whiter in deeper water.

#### Depth shading

Color shades depth areas based on the depth value of the depth range shade. The system will interpolate a color based on the depth within the range. It colors darker shades of blue in deeper water and whiter in shallower water.

#### Paper chart

Color shades the depths similar to the National Oceanic and Atmospheric Administration (NOAA) colors present in the paper charts.

#### Traditional

Color shades depth areas based on the data defined by the chart data. Charts have their own color palette that is defined in the chart data.

#### Safety shading

Color shades depth areas based on the safety depth limit. The limit determines which depths will be drawn without blue shading.

### Depth filter

Filters out depth values shallower than the selected depth filter limit.

### Safety depth

Charts use different shades of blue to distinguish between shallow (lighter shades) and deep (darker shades) water. After enabling the safety shading depth palette, specify the desired safety depth limit. The Safety depth sets the limit at which depths will be drawn without blue shading.

### Shading

Shades different areas of the seabed, depending on the selected Shading category.

→ **Note:** Composition and Vegetation shading are not applicable to C-MAP charts.



#### Depth 1 and Depth 2

Depth presets that shade different depths in different colors.

#### Custom

You can adjust the depth threshold, color and opacity (transparency) of color shading for Depth 1 and Depth 2.

CUSTOM SHADING			
Depth 1	Depth 2	Composition	Vegetation
Depth (m)	Color	Opacity (%)	
0		100	
12		100	
24		100	
37		100	
49		100	
Add Point...			

### 3D exaggeration

Graphical settings that are available in 3D mode only. Exaggeration is a multiplier applied to the drawn height of hills on land, and troughs in water to make them look taller or deeper.

→ **Note:** This option is grayed out if the data is not available in the map card inserted.

### Genesis Layer

The Genesis Layer displays high-resolution contours contributed by Genesis users that have passed a quality check.

This option toggles the Genesis layer on/off on the chart image.

Available only if the C-MAP chart contains Genesis Layer data.

## Navionics charts

Some Navionics features require the most current data from Navionics. For those features, a message is displayed stating that the feature is unavailable if you do not have the appropriate Navionics charts or chart card inserted.

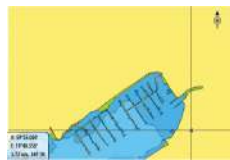
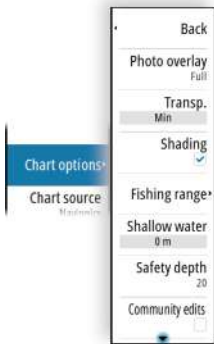
You can also get a message if you try to use a restricted feature when the Navionics chart card is not activated. To activate the card, contact Navionics.

### Navionics specific chart options

#### Photo overlay

Photo overlay enables you to view satellite photo images of an area as an overlay on the chart. The availability of such photos is limited to certain regions, and cartography versions.

You can view photo overlays in either 2D or 3D modes.



No Photo overlay

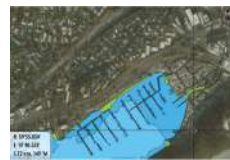


Photo overlay, land only



Full Photo overlay

#### Photo transparency

The Photo transparency sets the opaqueness of the photo overlay. With minimum transparency settings the chart details are almost hidden by the photo.



Minimum transparency



Maximum transparency

#### Chart shading

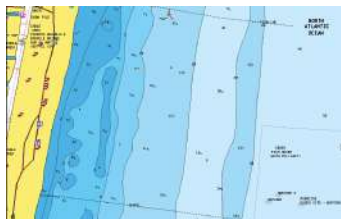
Shading adds terrain information to the chart.

#### Fishing range

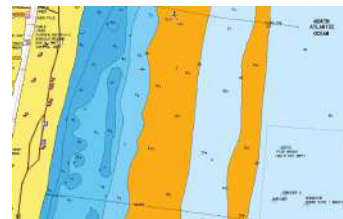
Select a range of depths between which Navionics fills with a different color.

This allows you to highlight a specific range of depths for fishing purposes. The range is only as accurate as the underlying chart data, meaning that if the chart only contains 5 meter intervals for contour lines, the shading is rounded to the nearest available contour line.





*No Depth highlight range*



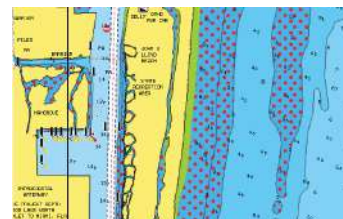
*Depth highlight range: 6 m - 12 m*

### **Shallow water highlight**

This highlights areas of shallow water between 0 and the selected depth (up to 10 meters/30 feet).



*No shallow water highlighted*



*Shallow water highlight: 0 m - 3 m*

### **Safety depth**

The Navionics charts use different shades of blue to distinguish between shallow and deep water.

Safety depth, based on a selected limit, is drawn without blue shading.

→ **Note:** The built in Navionics database features data down to 20 m, after which it is all white.

### **Community edits**

Toggles on the chart layer including Navionics edits. These are user information or edits uploaded to Navionics Community by users, and made available in Navionics charts.

### **SonarChart**

The system supports the Navionics SonarChart feature.

#### **SonarChart Live**

SonarChart Live is a real-time feature where the device creates an overlay of depth contours based on your own live sonar soundings.

When you select SonarChart Live overlay the menu expands to display SonarChart Live options.



#### **Transparency**

The SonarChart Live overlay is drawn on top of other chart data. The chart data is completely covered at minimum transparency. Adjust the transparency to allow the chart details to be seen.

#### **Minimum depth**

Adjusts what SonarChart Live rendering treats as the safety depth. This affects the coloring of the SonarChart Live area. As the vessel approaches the safety depth, the SonarChart Live area will gradually change from a simple grey/white to red.

### Palettes

Used for selecting the image's color palette.

### SCL History

Select to display previously recorded data on the chart overlay.

### SC Density

Controls the density of the SonarChart and SonarChart Live contours.

### Colored seabed areas

Used for displaying different depth areas in different shades of blue.

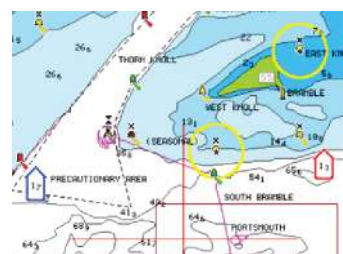
### Navionics Dynamic tides and current icons

Shows tides and currents with a gauge and an arrow instead of the diamond icons used for static tides and current information.

The tide and current data available in Navionics charts are related to a specific date and time. The system animates the arrows and/or gauges to show the tides and currents evolution over time.



*Dynamic tide information*



*Dynamic current information*

The following icons and symbology are used:

### Current speed

The arrow length depends on the rate, and the symbol is rotated according to flow direction. Flow rate is shown inside the arrow symbol. The red symbol is used when current speed is increasing, and the blue symbol is used when current speed is decreasing.



### Tide height

The gauge has 8 labels and is set according to absolute max/min value of the evaluated day. The red arrow is used when tide is rising, and the blue arrow is used when tide is falling.



→ **Note:** All numeric values are shown in the relevant system units (unit of measurement) set by user.

### Rock filter level

Hides rock identification on the chart beneath a given depth.

This helps you to declutter charts in areas where there are many rocks located at depths well below your vessel's draught.

### Contours depth

Determines which contours you see on the chart down to the selected safety depth value.

### Presentation type

Displays marine charting information such as symbols, colors of the navigation chart and wording for either International or U.S. presentation types.

### Annotation

Determines what area information, such as names of locations and notes of areas, is available to display.

### Chart details

Provides you with different levels of geographical layer information.

### Easy View

Magnifying feature that increases the size of chart items and text.

→ **Note:** There is no indication on the chart showing that this feature is active.

## Chart settings

The options in the chart settings dialog depends on which chart source is selected in the system.



### 3D boat selection

Determines which icon to use on 3D charts.

### Range rings

The range rings can be used to present the distance from your vessel to other panel objects. The range scale is set automatically by the system to suit the panel scale.

### Extension lines

Sets the lengths of the extension lines for your vessel and for other vessels shown as AIS targets.

Select to show or hide the heading and course extension lines for your vessel.

#### Extension length

**A:** Heading

**B:** Course Over Ground (COG)

The length of the extension line is either set as a fixed distance, or to indicate the distance the vessel moves in the selected time period. If no options are turned on for the vessel then no extension lines are shown.

Your vessel heading is based on information from the active heading sensor and the COG is based on information from the active GPS sensor.

Your vessel heading and the COG is based on information from the GPS.

For other vessels, COG data is included in the message received from the AIS system.

### ForwardScan

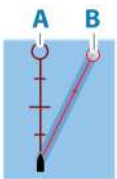
If you have ForwardScan and this option is selected, the ForwardScan heading extension is shown on the chart. Refer to "*Heading extension*" on page 88.

### SonarChart Live tide correction

When selected, the tide correction feature uses information from nearby tide stations (if available) to adjust the depth values used by SonarChart Live as the sonar is recorded.

### Synchronize 2D/3D chart

Links the position shown on one chart with the position shown on the other chart when a 2D and a 3D chart are shown side by side.



**Pop-up information**

Determines whether basic information for panel items is displayed when you select the item.

**Grid lines**

Turns on/off viewing of longitude and latitude grid lines on the panel.

**Waypoints, Routes, and Tracks**

Turns on/off displaying of these items on chart panels.

# 5

## Waypoints, routes, and tracks

### Waypoints, Routes, and Tracks dialogs

These dialogs give access to advanced edit functions and settings for these items.



### Waypoints

#### About waypoints

A waypoint is a user generated mark positioned on the:

- chart
- echosounder image
- radar image
- navigation panel

Each waypoint has an exact position with latitude and longitude coordinates.

A waypoint positioned on the echosounder image has a depth value, in addition to position information.

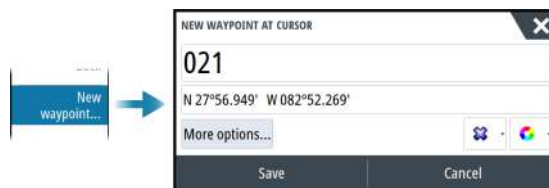
A waypoint is used to mark a position you later may want to return to. Two or more waypoints can also be combined to create a route.

#### Saving waypoints

Save a waypoint at the cursor position if active or at the vessel's position if the cursor is not active.

To save a waypoint:

- Select the new waypoint option in the menu



#### Moving a waypoint

A waypoint can be moved from the position if active and if the waypoint is selected in the menu.

To move a waypoint to a new position, select the move waypoint menu option and then select the new waypoint location on the image.

To save the waypoint at the new position, select the finish moving menu option

#### Edit a waypoint

You can edit all information about a waypoint from the edit waypoint dialog.

The dialog is activated by selecting the waypoint, and then selecting edit from the menu.

The dialog can also be accessed from the waypoints tool on the home page.

## Delete a waypoint

You can delete a waypoint from the edit waypoint dialog or by selecting the delete menu option when the waypoint is activated.

You can also delete waypoints from the waypoints tool on the home page.

You can delete MOB waypoints the same way.

## Waypoint alarm settings

You can set an alarm radius for each individual waypoint you create. The alarm is set in the Edit Waypoint dialog.

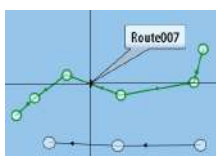
→ **Note:** The waypoint radius alarm must be toggled ON in the alarm dialog to activate an alarm when your vessel comes within the defined radius. For more information, refer to "Alarm dialogs" on page 137.

## Routes

### About routes

A route consists of a series of routepoints entered in the order that you want to navigate them.

When you select a route on the chart panel it turns green, and the route name is displayed.



### Creating a new route on the chart panel

1. Activate the cursor on the chart panel
2. Select the new route option from the menu
3. Position the first waypoint on the chart panel
4. Continue positioning new routepoints on the chart panel until the route is completed
5. Save the route by selecting the save option in the menu.

### Edit a route from the chart panel

1. Select the route to make it active
2. Select the route edit option in the menu
3. Position the new routepoint on the chart panel:
  - If you set the new routepoint on a leg, a new point is added between existing routepoints
  - If you set the new routepoint outside the route, the new routepoint is added after the last point in the route
4. Drag a routepoint to move it to a new position
5. Save the route by selecting the save option in the menu.

→ **Note:** The menu changes depending on the selected edit option. All edits are confirmed or cancelled from the menu.

### Creating routes using existing waypoints

A new route can be created by combining existing waypoints from the Routes dialog. The dialog is activated by using the Waypoints tool on the Home page and then selecting the Routes tab.

### Creating a route based on a trip

You can create a route based on a historical trip. Select a trip in the TripIntel history dialog and then the create route option.

### Converting tracks to routes

You can convert a track to a route from the edit track dialog. The dialog is activated by activating the track, and then:

- Selecting the track's pop-up
- Selecting the track in the menu

The edit track dialog can also be accessed by selecting the waypoints tool on the home page.

### Dock-to-dock Autorouting and Easy Routing

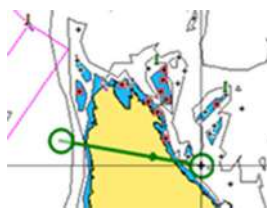
The Dock-to-dock Autorouting and Easy Routing suggest new routepoint positions based on information in the map and on your boat's size. Before you can start using this feature the boat draught, width and height must be entered into the system. The boat settings dialog is automatically displayed if the information is missing when you start the feature. To enter boat settings, refer to "System settings" on page 134.

- **Note:** It is not possible to start the Dock-to-dock Autorouting or Easy Routing if one of the selected routepoints is located in an unsafe area. A warning dialog is displayed, and you have to move the relevant routepoint(s) to a safe area to proceed.
- **Note:** If no compatible cartography is available, the Dock-to-dock Autorouting or Easy Routing menu option is not available. Compatible cartography includes C-MAP MAX-N+, Navionics+ and Navionics Platinum.

1. Position at least two routepoints on a new route, or open an existing route for editing.
2. Select the Dock-to-dock Autorouting menu option, followed by:
  - Entire Route - if you want the system to add new routepoints between the first and the last routepoint of the open route.
  - Selection - if you want to manually select the routepoints that define the limits for the autorouting, then select the relevant routepoints. Selected routepoints are colored red. Only two routepoints can be selected, and the system discards any routepoints between your selected start and end points.
3. Select the accept option to start the automatic routing.
  - When the automatic routing is completed the route appears in preview mode, and the legs are color coded to indicate safe or unsafe areas. Navionics uses red (unsafe) and green (safe), while C-MAP uses red (unsafe), yellow (dangerous) and green (safe).
4. Move any routepoints if required when the route is in preview mode.
5. Select the keep option to accept the routepoints positions.
6. Eventually repeat step 2 (selection) and step 3 if you want the system to automatically position routepoints for other parts of the route.
7. Select the save option to complete the automatic routing and save the route.

### Dock-to-dock Autorouting and Easy Routing examples

- **Entire route** option used when first and last route points are selected.



First and last routepoint

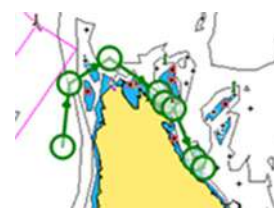


Result after automatic routing

- **Selection** option used for autorouting part of a route.



Two routepoints selected



Result after automatic routing

## The edit route dialog

You can manage routes and routepoints, and change route properties using the Edit Route dialog. This dialog is activated by selecting an active route's pop-up or from the menu by selecting the route then the details option.

The dialog can also be accessed by using the Waypoints tool on the Home page and then selecting a route in the dialog.

Select a routepoint in the edit dialog to insert a new routepoint after it or remove the routepoint.

Select the display option to show the route on the chart.



Leg	Waypoint	Distance (NM)	Bearing (°M)
0	Rpt001	2111	357
1	Rpt002	35.3	079
2	Rpt003	31.4	152
3	Rpt004	24.9	173

## Delete a route

You can delete a route by selecting the Delete menu option when the route is activated.

You can also delete routes from the edit routes dialog. Refer to *"The edit route dialog"* on page 41.

## Tracks

### About tracks

Tracks are a graphical presentation of the historical path of the vessel. They allow for retracing where your boat has travelled. Tracks can be converted to routes from the edit dialog.

From the factory, the system is set to automatically track and draw the vessel's movement on the chart panel. The system continues to record the tracks until the length reaches the maximum points, and then automatically begins overwriting the oldest points.

The automatic tracking function can be turned off from the Tracks dialog.

### Creating a new track

You can start a new track from the Tracks dialog. The dialog is activated:

- by using the Waypoints tool on the Home page and selecting the Tracks tab
- by selecting the New track or Tracks option on the Plot dialog.

### Track settings

Tracks are made up of a series of points connected by line segments whose length depends on the frequency of the recording.

You can select to position track points based on time settings, distance, or by letting the system position a waypoint automatically when a course change is registered.

→ **Note:** The Tracks option must also be turned on in the Tracks dialog to be visible on panels.

### Coloring tracks

To color tracks:





- Select the track in the Tracks dialog and set the color for the entire track in the Edit Track dialog.
- Select to let the system color the track based on source data and high/low settings. Refer to "*Color tracks based on data*" on page 29.

## C-MAP Embark

You can access the C-MAP Embark web site from a PC or use the C-MAP Embark app on your smart device to manage:

- waypoints
- routes
- tracks

Use the unit's C-MAP Embark feature to synchronize between the unit and C-MAP Embark.

### Requirements

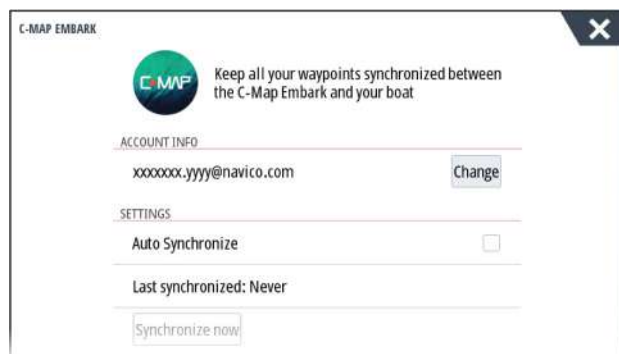
- An account with C-MAP Embark
- To synchronize, the unit must be connected to the internet.

### Synchronizing

To synchronize the MFD and C-MAP Embark, open the C-MAP Embark feature from the System Controls dialog or the Services settings dialog.

After sign-in, the system advises the last time synchronizing occurred and the following options are available:

- Change - use to change sign-in credentials
- Auto Synchronize - synchronizing occurs periodically in the background when connected to the internet
- Synchronize now - synchronizing occurs immediately



# 6

## Navigating

### About navigating

The navigation function included in the system allows you to navigate to the cursor position, to a waypoint, or along a predefined route.

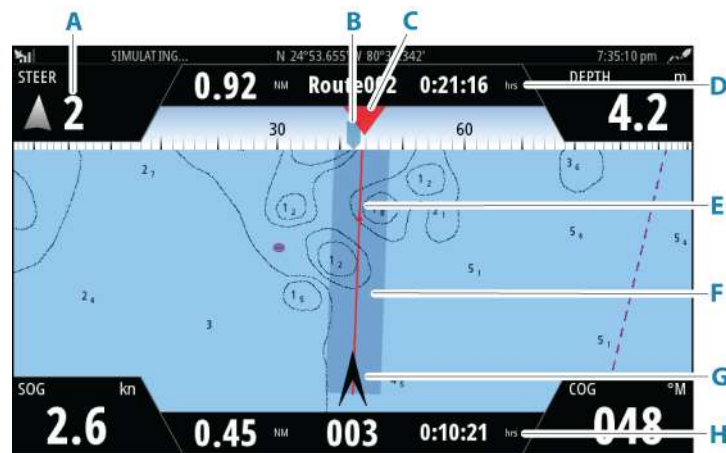
If autopilot functionality is included in your system, the autopilot can be set to automatically navigate the vessel.

For information about positioning waypoints and creating routes, refer to *"Waypoints, routes, and tracks"* on page 38.

### Navigation panels

#### The Nav panel

The Nav panel is activated from the Home page, either as a full page panel or as part of a split page.



**A Data fields**

**B Vessel heading**

**C Bearing to next routepoint**

**D Route information**

Indicates the distance of the route, the route name, and the estimated time to reach the end of the route.

**E Bearing line with allowed off course limit**

When travelling on a route, the bearing line shows the intended course from one waypoint towards the next. When navigating towards a waypoint (cursor position, MOB or an entered lat/lon position), the bearing line shows the intended course from the point at which navigation was started towards the waypoint.

**F XTE limit**

If the XTE (Cross Track Error) exceeds the defined XTE limit, this is indicated with a red arrow including the distance from the track line. Refer to *"XTE limit"* on page 45.

**G Vessel symbol**

Indicates boat position and heading.

**H Routepoint information**

Indicates the distance to the routepoint, the routepoint name, and the estimated time to reach the routepoint.

#### The Position panels

You can switch between displaying the Navigation panel or the Position panel. The Position panel is activated from the menu.

By default, there is one position panel available showing GPS position.

If Loran is enabled in the Navigation settings dialog, there are two position panels. This is indicated with arrow symbols on left and right side of the panel.

You toggle between the panels by:

- selecting the left or right arrow symbols



GPS position info



Loran position info

## Use menu options

You can use menu options to:



- navigate to a waypoint
- navigate a route

While navigating, the menu expands to provide options to:



- skip waypoints when navigating a route
- restart navigating to a waypoint or a route
- cancel navigating to a waypoint or a route

## Navigating with the autopilot

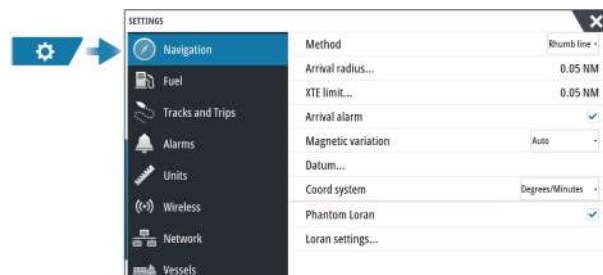
When you start navigation on a system with autopilot functionality, you are prompted to set the autopilot to navigation mode.

→ **Note:** The prompt to set the autopilot to navigation mode is disabled if the boat type is set to SAIL in the Autopilot Commissioning dialog.

If you choose not to engage the autopilot, the autopilot can be set to navigation mode from the Autopilot Controller later on.

For more information about autopilot functionality, refer to the autopilot chapter of the autopilot being used.

## Navigation settings



### Navigation method

Different methods are available for calculating the distance and bearing between any two geographical points.

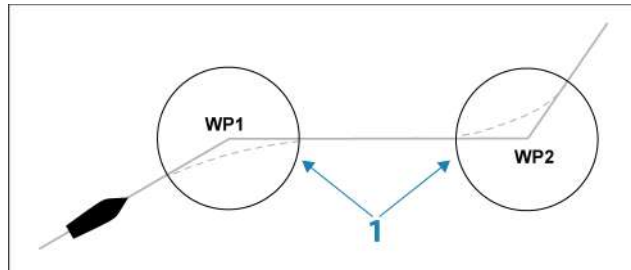
The Great circle route is the shortest path between two points. However, if you are to travel along such a route, it would be difficult to steer manually as the heading would constantly be changing (except in the case of due north, south, or along the equator).

Rhumb lines are tracks of constant bearing. It is possible to travel between two locations using Rhumb line computation, but the distance would usually be greater than if Great circle is used.

### Arrival radius

Sets an invisible circle around the destination waypoint. The vessel is considered arrived at the waypoint when it is within this radius.

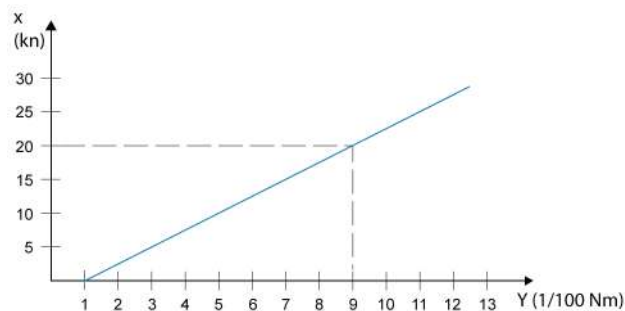
When you are navigating a route, the arrival radius defines the point at which a turn is initiated.



The arrival circle (1) should be adjusted according to boat speed. The higher the speed, the wider the circle.

The intention is to make the autopilot start the heading change in due time to make a smooth turn onto the next leg.

The figure below may be used to select the appropriate waypoint circle when creating the route.



→ **Note:** The distance between any waypoints in a route must not be smaller than the radius of the waypoint arrival circle.

### XTE limit

Defines how far the vessel can deviate from the selected route. If the vessel goes beyond this limit, an alarm is activated.

### Arrival alarm

When the arrival alarm is enabled, an alarm is activated when the vessel reaches the waypoint or when it is within the specified arrival radius.

### Magnetic variation

Magnetic variation is the difference between true bearings and magnetic bearings, caused by different locations of the Geographic and the Magnetic north poles. Any local anomalies such as iron deposits might also affect the magnetic bearings.

When set to Auto, the system automatically converts magnetic north to true north. Select manual mode if you need to enter your own local magnetic variation.

### **Datum**

This system uses the WGS datum format, which is a standard for use in cartography and satellite navigation (including GPS).

You can change the datum format to match other systems.

### **Coordinate system**

Used to set the geographic coordinate system used on your system.

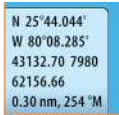
### **Phantom Loran**

Enables use of Phantom Loran positioning system.

Defines Loran chains (GRI) and preferred station for waypoint entry, cursor position and position panel.

The graphic example shows a cursor position window with Loran position information.

For more information refer to your Loran system documentation.



# 7

## TripIntel

### About TripIntel

TripIntel lets you store and recall information on trips. You can use the information to make informed decisions prior to commencing a trip, or when a trip is underway.



### Current trip statistics

The Information tab on the TripIntel page shows current trip statistics:

- Distance traveled
- Time traveled
- Average speed
- Maximum speed
- Fuel economy
- Fuel used

### Automatic trip recording

There is an automatic trip detection feature. When you start navigating you are prompted to start recording the trip if no trip is currently underway and your speed has been more than 2 knots for 20 seconds. You will be prompted to continue a trip or start a new trip if the trip was not explicitly saved before a power off.

You can manually start the recording later from the TripIntel page.

You can turn off the automatic trip detection feature from the Tracks and Trip settings dialog.

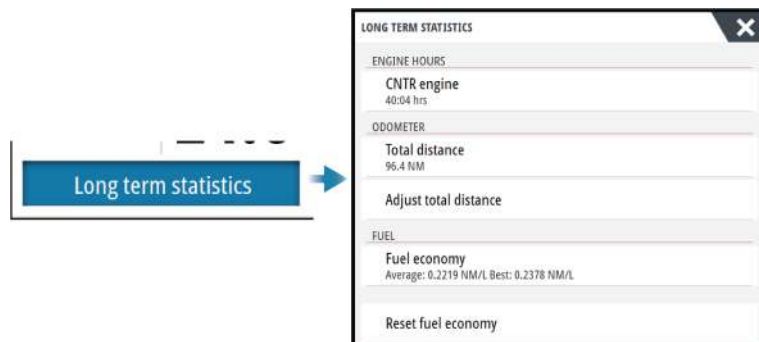
### Start and stop trip recordings

If you have selected to not start recording a trip from the automatic trip detection prompt, you can manually start a recording from the TripIntel page.

The **Start** and **Stop** trip options let you specify a trip recording. You can use them to segment a single passage into multiple trips providing a finer level of control of the information that is logged for a journey.

### Long-term statistics

Select Long Term Statistics to view seasonal trip information.



## Adjust total distance

Select the Adjust total distance button to change the Total distance. Use this option if you have not recorded a trip or part of a trip that you have taken and want to include the distance in the Total distance statistic.

## Reset fuel economy

Select **Reset fuel economy** to reset the fuel economy in the Fuel economy gauge on the Instrument bar.

## Estimated fuel range ring

The Estimated fuel range ring on the TriplIntel page represents the estimated total distance that the boat can travel based on historical consumption, and the amount of fuel left in the tanks.

- **Note:** The Estimated fuel range ring represents fuel consumption on a one way trip only, it does not include fuel estimates for the return trip to your current location. It represents the distance in which your boat will completely run out of fuel.
- **Note:** The Estimated fuel range ring is calculated from the Vessel Fuel Remaining only, not level sensors. When recording your refueling, you must 'Set to full' or 'Add fuel' for the range ring to be accurate.

## Fuel gauge

The Fuel Gauge on the TriplIntel page, and on the economy gauge is displayed based on the setting in the Vessel Setup page. You must select the Fuel Remaining measurement type.

- Fuel consumed by engine(s)
- Fuel tank level sensor(s)

→ **Note:** This is only for the TriplIntel page and the economy graph.

## Record your refueling

Select the Fuel button to record the amount of your refuel. The refuel information is used for calculating the Vessel Fuel Remaining amount.

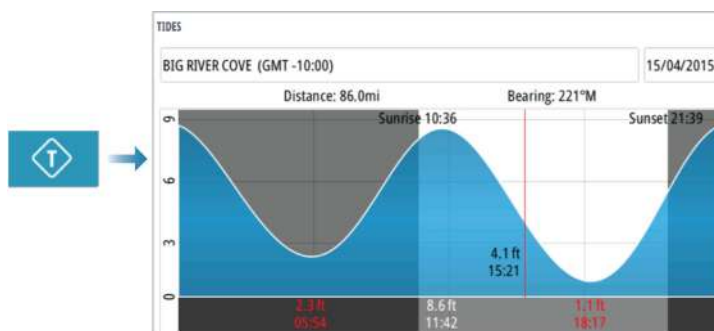


## Tide gauge

The Tide gauge on the TriplIntel page shows the tide height at the selected tide station.

## Tide graphs and stations

Tide stations on chart cards provide tide information displayed in TriplIntel.



## View trip recordings

Recorded trips are listed in the history tab on the TriplIntel page. To view detailed trip information select a trip in the list.

TRIPINTEL

Current trip History

Current trip

TRIP HISTORY

fre. jan 11 2019, 1:20 p.m.	37m 45s	11.37 NM
Tibbs Beach-Coxs Bay	45m 10s	14.10 NM
View Bay-Shelly Bay	1h 14m	20.00 NM

### Change trip recording names

Trips are given generic names when they are created. You can change the trip name to a more meaningful one by selecting it on the History list and then select the name in the Trip History details dialog.



# 8

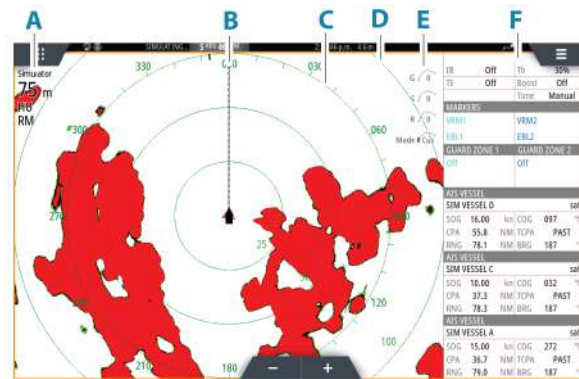
## Radar

### About radar

Several radar sensors are supported.

The menu options available depend on the radar sensor(s) connected to the system.

### The Radar panel



- A** Radar information window
- B** Heading line\*
- C** Compass\*
- D** Range rings \*
- E** Quick image controls
- F** Data bar\*\*

\* Optional radar symbology. Radar symbology can be turned ON/OFF collectively from the radar menu, or individually as described in radar settings dialog.

\*\* You can show or hide the data bar using the data bar option in the radar settings dialog.

### Dual radar

You can connect to any combination of two supported radars and see both radar images at the same time.

→ **Note:** Interference will be seen on the Broadband Radar on most ranges when a pulse or Halo radar, and a Broadband radar are transmitting at the same time on the same boat. We recommend to only transmit on one radar at a time. For example, transmit Broadband radar for typical navigational usage, or pulse or Halo radar to locate weather cells, defined coastlines at a distance and to trigger Racons.

You can select a dual radar panel by pressing and holding the Radar application button on the home page, or by creating a favorite page with two radar panels.

### Selecting the radar source

You specify the radar in the Radar panel by selecting one of the available radars in the radar source menu option. If you have a multiple Radar panel, the radar is set individually for each radar panel. Activate one of the radar panels, and then select one of the available radars in the radar source menu option. Repeat the process for the second radar panel, and select an alternative radar for this panel.

→ **Note:** The 3-digit radar source number is the last 3 digits of the radar's serial number.

### Radar overlay

You can overlay the Radar image on the Chart. This can help you to easily interpret the radar image by correlating the radar targets with charted objects.

→ **Note:** A heading sensor must be present in the system for radar overlay.

When the radar overlay is selected, basic radar operational functions are available from the Chart panel's menu.

### Selecting radar overlay source on chart panels

To select the radar source of the radar overlay displayed on the chart panel, use the **Radar options** and then **Source** chart panel menu options to select the radar source.

For chart pages with more than one chart with radar overlay, it is possible to set up different radars sources for each chart panel. Activate one of the chart panels and then select one of the available radars in the radar source menu option. Repeat the process for the second chart panel with radar overlay, and select an alternative radar for this panel.

## Radar operational modes

The radar's operational modes are controlled from the Radar menu. The following modes are available:

### Power off

The power to the radar scanner is turned off. **Power off** is only available when radar is in standby mode.

### Standby

The power to the radar scanner is on, but the radar is not transmitting.

→ **Note:** You can also put the radar in standby mode from the **System Controls** dialog.

### Transmit

The scanner is on and transmitting. Detected targets are drawn on the radar PPI (Plan Position Indicator).

→ **Note:** You can also put the radar in transmit mode from the **System Controls** dialog.

## Radar Range

You adjust radar range by selecting the zoom icons on the radar panel.

### Dual range

(Broadband 4G and Halo Radar only)

When connected to a Broadband 4G or Halo radar, it is possible to run the radar in Dual Range mode.

The radar appears in the radar sources menu as two virtual radar sources A and B. Range and radar controls for each virtual radar source are fully independent and the source can be selected for a particular chart or radar panel in the same manner as dual radar described in "*Selecting the radar source*" on page 50.

→ **Note:** Some controls that are related to physical properties of the radar itself are not independent of source. These are Fast Scan, Antenna Height and Bearing alignment.

MARPA is fully independent and up to 10 targets may be tracked for each virtual radar source.

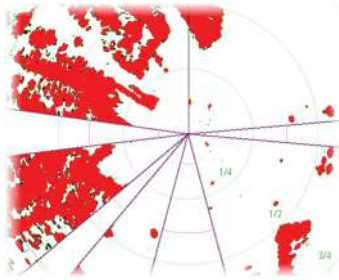
Up to two independent Guard Zones may also be defined for each virtual radar source.

## Radar sector blanking

(Halo Radar only)

You can define up to four sectors on the PPI inside which no radar data is transmitted. This enables you to blank-out interference caused by features on your boat or from a secondary radar. The blanking occurs on the main radar image and radar overlay on a chart. An enabled sector is shown as a magenta outline with 3 arcs crossing the blanking area. To specify radar sector blanking, refer to the Halo Radar Installation Manual.

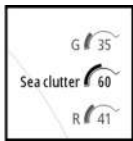
→ **Note:** Radar sector blanking is only available for Halo radars.



Main radar PPI



Radar overlay on a chart



## Adjusting the radar image

You may be able to improve the radar image by adjusting the radar sensitivity, and by filtering out the random echoes from sea and weather conditions.

The radar control images are located in the upper right corner of the radar panel. You select between the control images by selecting the control image or by pressing the rotary knob on a remote controller. Active control expands and displays its name in full. You can then adjust the value by using the slide bar or by turning the rotary knob on the remote controller. You can also adjust the image settings from the radar menu.

## Radar modes

Use modes are available with preset control settings for different environments. Not all modes are available for all radar transceivers.

### Modes in dual ranges

(Halo Radar only)

Modes can be set independently for each range. For example, you can have Offshore mode for range A and Weather mode for range B. However, interaction between ranges occurs in some cases:

- When using Bird mode for both ranges, maximum range is restricted to 24 NM and range resolution is reduced.
- Fast scan - The antenna rotation speed is set to the slower of the two modes selected. For example, Fast Scan is disabled when using Harbor and Weather modes because Fast Scan is Off in Weather mode.
- The Interference reject setting can affect the interference seen or removed on both ranges.

## Directional clutter rejection

(Broadband 4G Radar only)

This mode automatically works when GAIN = AUTO and SEA = HARBOR or OFFSHORE. The purpose is to allow smaller vessels to be seen in the leeward direction of the sea clutter. The GAIN of the radar receiver is increased dynamically during the sweep, in the leeward direction, for increased target sensitivity in heavier sea states.

When GAIN or SEA = MANUAL, the Directional Clutter Rejection mode will be OFF (non-directional).

In addition, CALM, MODERATE or ROUGH STC Curve settings are available in the Radar options menu to better optimize the radar image to your liking.

## Gain

The gain controls the sensitivity of the radar receiver.

A higher gain makes the radar more sensitive to radar returns, allowing it to display weaker targets. If the gain is set too high, the image might be cluttered with background noise.

Gain has a manual and an automatic mode. You toggle between automatic and manual mode in the slide bar.



## Sea clutter

Sea clutter is used to filter the effect of random echo returns from waves or rough water near the vessel.

When you increase Sea clutter, filtering the on-screen clutter caused by the echoes of waves is reduced.

The system includes predefined Sea clutter settings for harbor and offshore conditions, in addition to the manual mode where you can adjust the settings. You select Sea clutter modes from the menu. You can only adjust the Sea clutter value in manual mode.

## Auto Sea Offset

(Halo Radar only)

To allow fine tuning of the Sea control while in Auto mode (Auto uses directional adaptive clutter rejection), the Auto setting may be offset.

## Rain clutter

Rain clutter is used to reduce the effect of rain, snow or other weather conditions on the radar image.

The value should not be increased too much as this may filter out real targets.

## Using the cursor on a radar panel

By default, the cursor is not shown on a radar panel.

When you position the cursor on the radar panel, the cursor position window is activated.

## Go to cursor

You can navigate to a selected position on the image by positioning the cursor on the panel, and then using the go to cursor menu option.

## The cursor assist function

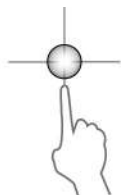
→ **Note:** The cursor assist function is available if it is enabled. Refer to "*Customizing the long press feature*" on page 18.

The cursor assist function allows for fine tuning and precision placement of the cursor without covering details with your finger.

Activate the cursor on the panel, then press and hold your finger on the screen to switch the cursor symbol to a selection circle, appearing above your finger.

Without removing your finger from the screen, drag the selection circle to the desired position.

When you remove your finger from the screen the cursor reverts to normal cursor operation.



## Advanced radar options

### Noise Rejection

(Broadband 4G and Halo radar only)

Sets the amount of noise filtering applied by the radar. Target sensitivity is increased at longer ranges when this control is set to Low or High, but does cause some loss of target discrimination.

→ **Note:** To get maximum range performance from Broadband 4G Radar, transmit on one range only, set the Noise Reject control to High and the threshold as low as possible. The default is 30% for less clutter on the screen. If OFF is selected for the unit, the range performance is about equal to 3G radar. In some areas where extreme high interference may exist, try OFF for best radar image.



## Radar threshold

The threshold sets required signal strength for the lowest radar signals. Radar returns below this limit are filtered and are not displayed.

Default value: 30%.

## Target expansion

Target expansion increases the length of targets in range, making them easier to see.

## Rejecting radar interference

Interference could be caused by radar signals from other radar units operating in the same frequency band.

A high setting reduces the interference from other radars.

In order not to miss weak targets, the interference rejection should be set to low when no interference exists.

## Target separation

The **Target separation** control allows you to control the target discrimination of the radar (separation between objects is more prominent).

## Fast scan

(Broadband and Halo radar only).

Sets the speed of the radar antenna rotation. This option gives faster target updates.

→ **Note:** Maximum speed may not be achieved depending on the radar Settings, Mode, and Range selected. The radar will only rotate as fast as the current control settings allow.

## Sea State

Set the Sea State control according to current sea conditions for best sea clutter rejection.

## Target boost

(3G and 4G Broadband, and Pulse Radar only)

The target boost control increases pulse length or reduces radar bandwidth to make targets appear larger in range and increase radar sensitivity.

## Radar view options

View menu options vary depending on your radar antenna.



### VelocityTrack

This option is available for radar antennas that have Doppler coloring functionality.

→ **Note:** When VelocityTrack is enabled antenna rotation speed may be reduced.

→ **Note:** When operating the radar in Dual range mode with one of the ranges set to 36 nm or more, increased VelocityTrack coloring noise over land areas may be seen.

Doppler coloring is a navigation aid to distinguish moving targets approaching or diverging from your vessel. The radar indicates if a target is approaching or diverging from your vessel when both these conditions are true:

- The target's relative speed is greater than the VelocityTrack speed threshold.
- The target is not geo-stationary (e.g. land or a marker buoy).

The following options are available:

- Off - turns off Doppler coloring
- Normal - approaching targets and diverging targets are colored.
- Approaching targets - only approaching targets are colored

The color of approaching and diverging targets depends on the palette used:

- Diverging targets are blue colored on all radar image palettes.
- Approaching target colors on radar image palettes:
  - Black/Red palette - Yellow
  - White/Red palette - Yellow
  - Black/Green palette - Red
  - Black/Yellow palette - Red

### VelocityTrack settings

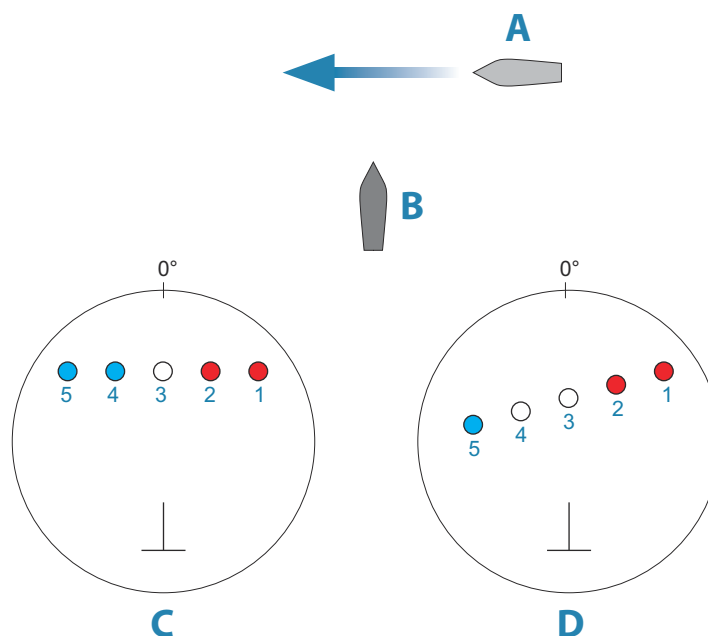
Use this dialog to set speed thresholds of targets to be colored.

The speed threshold can be defined to apply for the radar source of the selected radar panel only, or to all radar sources connected to the system. The setting is only applied to those radars powered and connected at the time the setting is made. If the all radar sources option is selected, newly connected radars will use the specified values automatically.

### VelocityTrack examples

Approaching and diverging moving targets can be indicated as neutral (not colored) in some circumstances. The navigator should be aware of these situations to safely use the VelocityTrack feature as an aid for collision avoidance.

Examples of how VelocityTrack behaves in 2 navigation scenarios is illustrated below. The illustrations show a target (**A**) crossing own vessel's (**B**) path.



The examples show the target movement (1-5) over 5 radar scans with the radar in relative motion mode.

In example **C**, own vessel COG is 0°, and speed is 0 knots.

In example **D**, own vessel COG is 0°, and speed is 10 knots.

In both examples, the target COG is 270°, and the speed is 20 knots.

The colors in the examples are according to the colors used for black/green and black/yellow radar palettes:

- Red (**C1/C2** and **D1/D2**), indicating the target is on an approaching path to own vessel. Its relative speed at that point is greater than the VelocityTrack speed threshold.
- Not colored (**C3** and **D3/D4**), indicating it is temporarily neutral because its relative speed at that point is less than the VelocityTrack speed threshold.
- Blue (**C4/C5** and **D5**), indicating the target is diverging away from own vessel and its relative speed at that point is greater than the VelocityTrack speed threshold.

### Radar symbology

Radar symbology defined in the Radar Settings panel can be turned on/off collectively. See the radar panel illustration showing optional radar items.

## Target trails

You can set how long the trails generated from each target on your radar panel remain. You can also turn OFF target trails.

→ **Note:** True motion is recommended when using Target trails

## Clearing target trails from the panel

When target trails are displayed on the panel, the radar menu expands to include an option where you can clear target trails from your radar panel temporarily. The target trails start to appear again unless you switch them off as described above.

## The radar palette

Different colors (palettes) can be used to represent detail on your radar panel.

## Radar orientation

Radar orientation is indicated on the upper left corner of the radar panel as either HU (Heading UP), NU (North Up) or CU (Course up).

### Head-up

In head-up mode, the heading line on the PPI is oriented on the 0° on the bearing scale and towards the top of the screen. The radar image is displayed relative to own ship, and when the ship turns the radar image rotates.

→ **Note:** Head-up is only available in relative motion mode, and it is the only orientation mode available if the radar is not connected to a heading source.

### North up

In North up mode the 0° indication on the PPI represents north. The heading line on the PPI is oriented according to own ship heading obtained from the gyro compass. When the ship turns the heading line changes its direction according to the ship's heading, while the radar image remains stabilized.

The North up orientation is not available if no heading source is connected to the radar. If heading data is lost, the system will automatically switch to Head-up orientation.

### Course up

In Course up mode, the top of the bearing scale indicates the ship's true course measured from north at the time Course up was activated. When the ship turns the bearing scale remains fixed, while the heading line rotates with the ship's yawing and course change.

The Course up orientation is reset by re-selecting the Course up mode.

## Radar motion mode

Radar motion is indicated on the upper left corner of the radar panel as either TM (True motion) or RM (Relative motion).

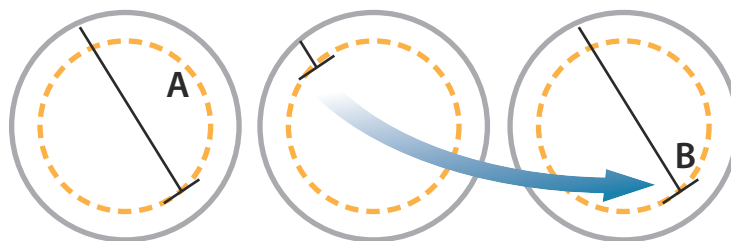
### Relative motion

In relative motion your vessel remains in a fixed location on the Radar PPI, and all other objects move relative to your position.

You select the position of the fixed location as described in *"Offsetting the PPI center"* on page 57.

### True motion

In true motion your vessel and all moving targets move across the Radar PPI as you travel. All stationary objects remain in a fixed position. When the vessel's symbol reaches 75% of the PPI radius (**A**), the radar image is redrawn with the vessel symbol re-positioned (**B**) 180° opposite the current heading bearing.

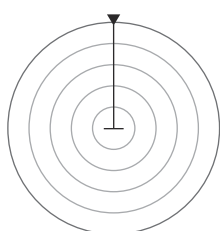


When true motion is selected, the true motion reset option is available from the menu. This allows for manually resetting the radar image and vessel symbol to its starting position.

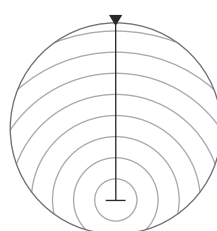
→ **Note:** True motion is only available when the PPI is in either north up or course up orientation mode.

### Offsetting the PPI center

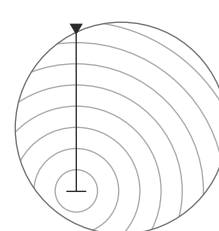
You can set the antenna position origin to a different location on the radar PPI. The options described in the next sections are available.



*PPI center: Center*



*PPI center: Look Ahead*



*PPI Center: Offset*

→ **Note:** The bearing scale is according to the Consistent Common Reference Point (CCRP), while the offset sets the radar antenna position on the PPI. The maximum off-centering allowed is 75% of the radius at the current range. This may result in the CCRP being outside of the bearing scale. In such cases the measurements are still taken by the CCRP and the bearing scale is compressed accordingly.

#### Center

The Center option resets the antenna position to the center of the PPI.

#### Look ahead

The Look ahead option is used to maximize the view ahead of the vessel. When selected the PPI center is placed at 70% of the radius of the PPI, 180° opposite the top of the display.

→ **Note:** Look ahead is only available for Heading Up radar orientation.

#### Offset

This option allows you to use the cursor for selecting the PPI center.

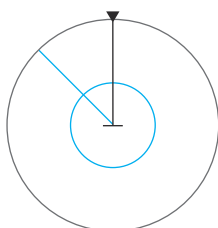
Move the cursor to the preferred offset position, and confirm your selection.

### EBL/VRM markers

The electronic bearing line (EBL) and variable range marker (VRM) allows quick measurements of range and bearing to vessels and landmasses within radar range. Two different EBL/VRMs can be placed on the radar image.

The EBL/VRMs are by default positioned from the center of the vessel. It is, however, possible to offset the reference point to any selected position on the radar image.

When positioned, you can turn the EBL/VRM on/off by selecting the relevant markers on the data bar, or by deselecting the marker from the menu.



#### Defining an EBL/VRM marker

1. Ensure that the cursor is not active
2. Activate the menu, select **EBL/VRM**, then select **EBL/VRM 1** or **EBL/VRM 2**
  - The EBL/VRM is now positioned on the radar image



3. Select the adjustment option from the menu if you need to reposition the marker, then adjust the marker by dragging it into position on the radar image
4. Select the save option to save your settings

### Placing EBL/VRM markers by using the cursor

1. Position the cursor on the radar image
2. Activate the menu
3. Select one of the EBL/VRM markers
  - The EBL line and the VRM circle are positioned according to the cursor position.

### Offsetting an EBL/VRM marker

1. Ensure that the cursor is not active
2. Activate the menu, select **EBL/VRM**, then select the marker you wish to offset
3. Select the set offset option
4. Position the cursor on the radar panel to set the offset position
5. Select the save option to save your settings.

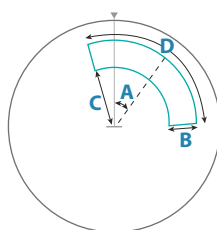
You can reset the EBL/VRM center to vessel position from the menu.

## Setting a guard zone around your vessel

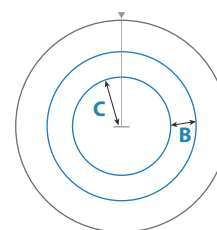
A guard zone is an area (either circular or a sector) that you can define on the radar image. When activated, an alarm alerts you when a radar target enters or exits the zone.

### Defining a guard zone

1. Ensure that the cursor is not active
2. Activate the menu, select **Guard zones**, then select one of the guard zones
3. Select the shape for the zone
  - The adjustment options depend on the guard zone shape
4. Select **Adjust** to define the settings for the guard zone. The values can be set from the menu or by dragging on the radar panel.
  - **A**: Bearing, relative to the vessel heading
  - **B**: Depth
  - **C**: Range, relative to vessel center
  - **D**: Width
5. Select the save option to save your settings.



Shape: Sector



Shape: Circle

### Alarm settings

An alarm is activated when a radar target breaches the guard zone limits. You can select if the alarm is activated when the target enters or exits the zone.

### Sensitivity

The guard zone sensitivity can be adjusted to eliminate alarms for small targets.

## MARPA targets

If the system includes a heading sensor, the MARPA function (Mini Automatic Radar Plotting Aid) can be used to track up to ten radar targets.







You can set alarms to notify you if a target gets too close. Refer to "*Radar settings*" on page 60.

MARPA tracking is an important tool for collision avoidance.

→ **Note:** MARPA requires heading data for both the radar and the unit.

### MARPA target symbols

The system uses the target symbols shown below.

	Acquiring MARPA target. Typically it takes up to 10 full rotations of the scanner.
	Tracking MARPA target, not moving or at anchor.
	Tracking and safe MARPA target with extension lines.
	Dangerous MARPA target. A target is defined as dangerous when it enters the guard zone defined on the radar panel.
	When no signals have been received within a time limit a target will be defined as lost. The target symbol represents the last valid position of the target before the reception of data was lost.
	Selected MARPA target, activated by positioning the cursor on the target icon. The target returns to the default target symbol when the cursor is removed.

### Tracking MARPA targets

1. Position the cursor on the target on the radar image
2. Select **Acquire targets** from the menu
3. Repeat the process if you want to track more targets

After your targets are identified, it may take up to 10 radar sweeps to acquire and then track the target.

### Cancelling MARPA target tracking

When targets are being tracked, the radar menu expands to include options for cancelling individual targets or to stop the tracking function.

Cancel tracking individual targets by selecting the target icon before activating the menu.

### Viewing MARPA target information

If the pop-up is activated, you can select a MARPA target to display basic target information. Information for the 3 MARPA targets closest to the vessel is also displayed in the data bar.

When a target is selected, detailed information for the target can be displayed from the menu.

You can display information about all MARPA targets by using the Vessels tool option on the Home page.

### MARPA alarm settings

You can define the following MARPA alarms:

- **MARPA target lost**  
Controls whether an alarm is activated when a MARPA target is lost.
- **MARPA unavailable**  
Controls whether an alarm is activated if you do not have the required inputs for MARPA to work (valid GPS position and heading sensor connected to the radar server).

## Recording radar data

You can record radar data and save the file internally in the unit, or save it onto a storage device connected to the unit.

A recorded radar file can be used for documenting an event or an operational error. A logged radar file can also be used by the simulator.

→ **Note:** The record menu option is available if recording is turned on in the Advanced system settings.

If more than one radar is available, you can select which source you want to record.

## Radar settings



### Radar symbology

You can select which optional radar items that should be turned on/off collectively from the menu. Refer to the Radar panel illustration.

### Bearings

Used for selecting whether the radar bearing should be measured in relation to True/Magnetic North (°T/°M) or to your relative heading (°R).

### Data bar

Turns on/off the radar data bar. Refer to the radar panel illustration.

The data bar can show up to 3 targets, arranged with the most dangerous targets on top. You can select to show MARPA targets on top and before any AIS targets, even if the AIS targets are closer to your vessel.

### MARPA settings

#### **History length**

Trails can be used to visualize the previous positions of a tracked target.

The history length defines the time presentation of the trail.

#### **Safe ring**

A safe ring can be added around your vessel to present the danger zone. The radius of the ring is the same as the closest point of approach as set in the Dangerous Vessels dialog. Refer to *"Defining dangerous vessels"* on page 64.

### Installation

The Installation option is used for radar installation, described in the separate Radar or NSO evo3S Installation manuals.

# 9

## AIS

### About AIS

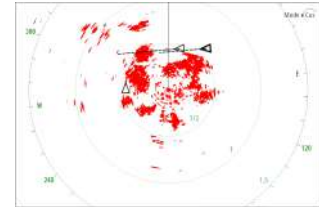
If a compatible AIS (Automatic Identification System) is connected to the system, AIS targets can be displayed and tracked. You can also see messages and position for DSC transmitting devices within range.

AIS targets can be displayed as overlay on chart and radar images.

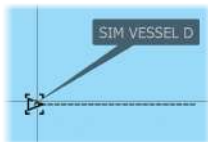
The AIS is an important tool for safe travelling and collision avoidance. You can set alarms to notify you if an AIS target gets too close or if the target is lost.



AIS vessels on a chart panel



AIS vessels on a radar panel



### Selecting an AIS target

When you select an AIS icon, the symbol changes to selected target symbol. Only one target can be selected at a time.

→ **Note:** Pop-up information must be enabled to see the vessel's name. Refer to "Chart settings" on page 36.

### Searching for AIS vessels

You can search for AIS targets by using the find option in the menu. If the cursor is active, the system searches for vessels around the cursor position. Without an active cursor, the system searches for vessels around your vessel's position.

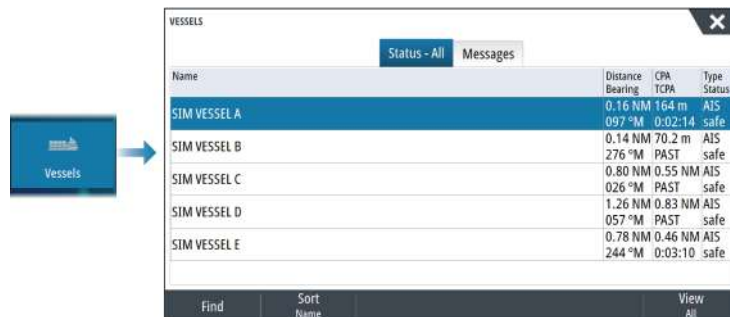
### Displaying target information

#### The vessels dialog

The vessels dialog displays a list of all targets.

By default, the dialog lists targets, arranged by distance to own vessel. You can select to change the sort order, and to display only a selected target type.

The vessels dialog also lists received AIS messages.

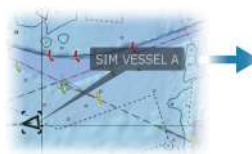


#### AIS vessel details

Detailed information about an AIS target is available from the AIS vessels details dialog.

To display the dialog:

- select the AIS pop-up
- select the info option in the menu



AIS VESSEL DETAILS	
SIM VESSEL A (MMSI: 366771124)	
Callign: ABC1234	Status: Safe
IMO: 123	NavStatus: Under engine
AIS Class: A	Draught (m): 1.0
Type: Unknown	Latitude: N 25°45.088'
Length (m): 12.2	Longitude: W 80°07.152'
Beam (m): 6.1	Accuracy: High (10m)
	ROT (°/s): 0.0
Bearing (°M): 101	SOG (kn): 15.00
Distance (NM): 0.36	COG (°M): 272
CPA (m): 55.8	Heading (°M): 272
TCPA (hrs): 0:00:48	Destination: MIAMI
Relative speed (kn): 26.91	ETA: 04/10/2008 12:00
Relative course (°M): 276	
Call	

## AIS information on radar panels

The radar data bar includes information about targets.

The targets are listed with the closest target on top, and are color coded to indicate target status.

AIS VESSEL	
SIM VESSEL A safe	
SOG	15.0 kn COG 271 °M
CPA	0.31 NM TCPA 0:00:12
BRG	0.32 NM BRG 9 °M
AIS VESSEL	
SIM VESSEL B safe	
SOG	20.0 kn COG 271 °M
CPA	- NM TCPA -
BRG	0.42 NM BRG 324 °M
AIS VESSEL	
SIM VESSEL E safe	
SOG	0.0 kn COG 006 °M
CPA	0.81 NM TCPA 0:00:09
BRG	0.81 NM BRG 269 °M

## Calling an AIS vessel

If the system includes a VHF radio supporting DSC (Digital Select Calling) calls over NMEA 2000 or NMEA 0183, a DSC call can be initiated to other vessels from the unit.

The call option is available in the AIS vessel details dialog, and in the vessel status dialog. Refer to *"Displaying target information"* on page 61.

## AIS SART

When an AIS SART (Search and Rescue Transponder) is activated, it starts transmitting its position and identification data. This data is received by your AIS device.

If your AIS receiver is not compliant with AIS SART, it interprets the received AIS SART data as a signal from a standard AIS transmitter. An icon is positioned on the chart, but this icon is an AIS vessel icon.

If your AIS receiver is compliant with AIS SART, the following takes place when AIS SART data is received:

- An AIS SART icon is located on the chart in the position received from the AIS SART
- An alarm message is displayed

If you have enabled the siren, the alarm message is followed by an audible alarm.

→ **Note:** The icon is green if the received AIS SART data is a test and not an active message.

## AIS SART alarm message

When data is received from an AIS SART, an alarm message is displayed. This message includes the AIS SART's unique MMSI number, and its position, distance, and bearing from your vessel.

Man Overboard	
AIS SART Activated	
MMSI:	512035499
Latitude:	S 36.53685°
Longitude:	E 174.86571°
Bearing (°M):	191
Distance (NM):	2.79
Ignore   Save waypoint   Activate MOB	

You have the following options:

- Ignore the alarm
  - The alarm is muted and the message closed. The alarm does not reappear

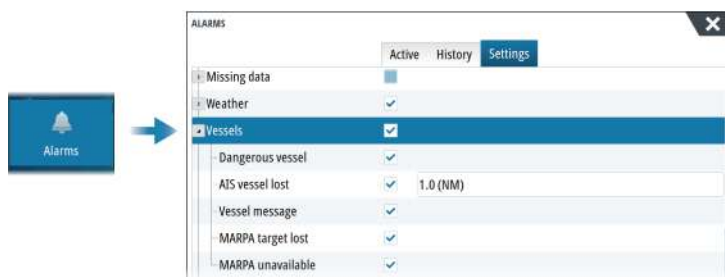
→ **Note:** If you ignore the alarm, the AIS SART icon remains visible on your chart, and the AIS SART remains in the vessels list.

- Save the waypoint

- The waypoint is saved to your waypoint list. This waypoint name is prefixed with MOB AIS SART - followed by the unique MMSI number of the SART. For example, MOB AIS SART - 12345678.
  - Activate the MOB function
    - The display switches to a zoomed chart panel, centered on the AIS SART position
    - The system creates an active route to the AIS SART position
- **Note:** If the MOB function is already active, this will be terminated and replaced by the new route towards the AIS SART position.
- **Note:** If the AIS stops receiving the AIS SART message, the AIS SART remains in the vessels list for 10 minutes after it receives the last signal.

## Vessel alarms

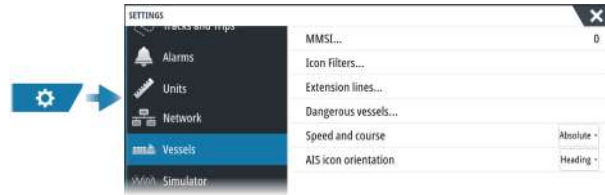
You can define several alarms to alert you if a target shows up within predefined range limits, or if a previously identified target is lost.



## AIS target symbols

	Sleeping AIS target (not moving or at anchor).
	Moving and safe AIS target with course extension line.
	Dangerous AIS target, illustrated with bold line. A target is defined as dangerous based on the CPA and TCPA settings. Refer to “Defining dangerous vessels”.
	Lost AIS target. When no signals have been received within a time limit, a target is defined as lost. The target symbol represents the last valid position of the target before the reception of data was lost.
	Selected AIS target, activated by selecting a target symbol. The target returns to the default target symbol when the cursor is removed from the symbol.
	AIS SART (AIS Search And Rescue Transmitter).
	AtoN (Aids To Navigation)

## Vessel settings



### MMSI

Used for entering your own MMSI (Maritime Mobile Service Identity) number into the system. You need to have this number entered to receive addressed messages from AIS and DSC vessels. You also need to have your MMSI number entered to avoid seeing your own vessel as an AIS target.

### Icon filters

By default, all targets are shown on the panel if an AIS device is connected to the system. You can select not to show any targets, or to filter the icons based on security settings, distance, and vessel speed.



### Extension lines

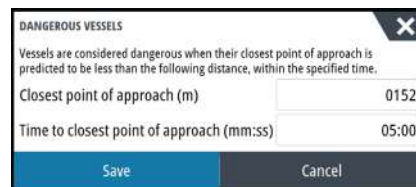
Defines the length of course over ground and heading extension lines for your own vessel and for other vessels.

The length of the extension lines is set to indicate the distance the vessel will move in the selected time period.

Your own vessel heading information is read from the active heading sensor, and COG information is received from the active GPS. For other vessels COG data is included in the message received from the AIS system.

### Defining dangerous vessels

You can use the CPA (Closest point of approach) and TCPA (Time to closest point of approach) values to define when a target should be considered as dangerous. When a target comes within the distance for CPA or within the time limit for TCPA, the symbol changes to the dangerous target symbol.



### Speed and course

The extension line can be used to indicate speed and course for targets, either as absolute (true) motion or relative to your vessel.

### AIS icon orientation

Sets the orientation of the AIS icon, either based on heading or COG information.

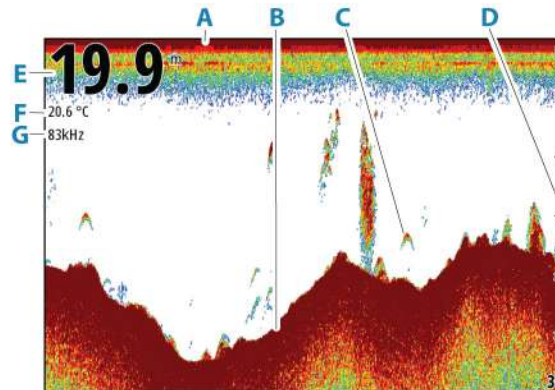
# 10

## Echosounder

### About echosounder

Any transducers must be connected to a sonar hub or another unit that is sharing sonar data.

### The image



- A** Surface
- B** Bottom
- C** Fish arches
- D** Range scale
- E** Depth
- F** Temperature
- G** Frequency

### Multiple sources

You can specify the source for the image in the active panel. You can display different sources simultaneously using a multi-panel page configuration.

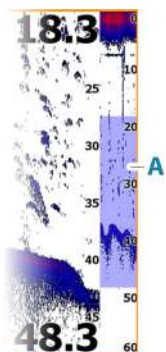
For more information on how to select the source for a panel, refer to "Source" on page 67.

### Zooming the image

You can zoom the image.

The zoom level is shown on the image. If the cursor is active, the system zooms in where the cursor is positioned.

kHz / 4x



### Zoom bar

The zoom bar (**A**) is displayed when you zoom the image.

Drag the zoom bar vertically to view different parts of the water column.

### Using the cursor on the panel

By default, the cursor is not shown on the image.

When you position the cursor on the panel, the image pauses and the cursor information window is activated. The depth and range of the cursor is shown at the cursor position.

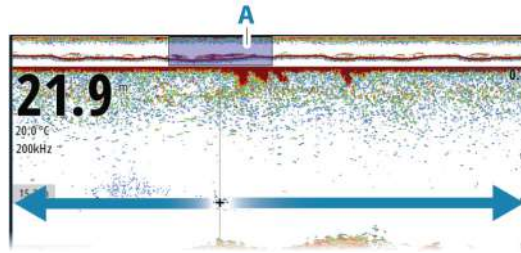
### Viewing history

Whenever the cursor is shown on the panel, the history bar (**A**) is shown at the top of the panel. The history bar shows the image you are currently viewing in relation to the total image history stored.

You can view history by panning the image.



To resume normal scrolling, clear the cursor.



## Recording log data

### Start recording log data

You can start recording log data and save the file internally in the unit, or save it onto a storage device connected to the unit.

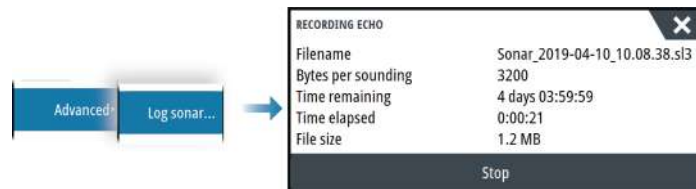
When the data is being recorded, there is a flashing red symbol in the top left corner and a message appears periodically at the bottom of the screen.

Specify recording settings in the recording dialog.



### Stop recording log data

Use the stop logging option to stop recording log data.



## Viewing recorded data

Both internally and externally stored sounder records can be reviewed when the view sonar log option is selected in the echo settings dialog. Refer to "Echosounder settings" on page 73.

## Upload sonar logs to C-MAP Genesis

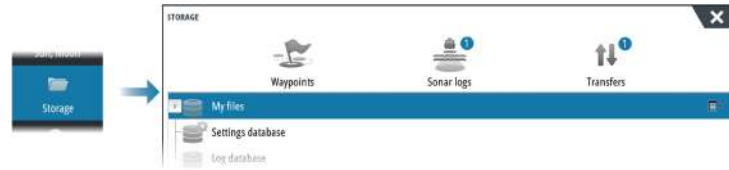
To upload sonar logs to C-MAP Genesis do one of the following:

- Use the services option. Follow the prompts to sign in and transfer the log files to C-MAP Genesis.



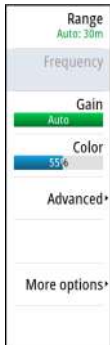
- Use the Storage dialog. Select the sonar logs icon and the logs you want to transfer. If you are already signed in to C-MAP Genesis the files are transferred. If you are not signed in, select the transfers icon and follow the prompts to sign in and transfer the log files to C-

MAP Genesis. You can sign in and transfer files at a later time when the unit is connected to the internet.



## Customizing the image

Use the menu to customize the image. When the cursor is active, some options in the menu are replaced with cursor mode features. Select the clear cursor option to return to the normal menu.



### Range

The range setting determines which water depth that is visible on the screen.

→ **Note:** Setting a deep range in shallow water may cause the system to lose track of the depth.

### Frequency

The unit supports several transducer frequencies. Available frequencies depend on the transducer model that is configured for use.

- A low frequency, for example 50 kHz, will go deep. It generates a wide cone but is more sensitive to noise. It is good for bottom discrimination and wide area search.
- A high frequency, for example 200 kHz, offers higher discrimination and is less sensitive to noise. It is good for separating targets and for higher speed vessels.

### Gain

The gain controls the sensitivity. The more you increase the gain, the more details are shown on the image. However, a higher gain setting may introduce more background clutter. If the gain is set too low, weak echoes might not be displayed.

A manual and an automatic gain mode are available. By default, the gain is set to Auto.

### Color

Strong and weak echo signals have different colors to indicate the different signal strengths. The colors used depend on which palette you select.

The more you increase the color setting, the more echoes are displayed in the color at the strong return end of the scale.

### Source

→ **Note:** Available only if multiple sources with the same capability are available.

Used to specify the source for the image in the active panel.

You can display different sources simultaneously, using a multi-panel page configuration. Menu options for each panel are independent.

→ **Note:** Using transducers at the same frequency can cause interference.

For source setup information, refer to the NSO evo3S Installation Manual.

### Measuring distance

The cursor can be used to measure the distance between the positions of two observations on the image.

1. Position the cursor on the point from where you want to measure the distance
2. Select the measure menu option

→ **Note:** The measure option is not available unless the cursor is placed on the image.

3. Position the cursor on the second measuring point

- A line is drawn between the measuring points, and the distance listed in the Cursor Information window

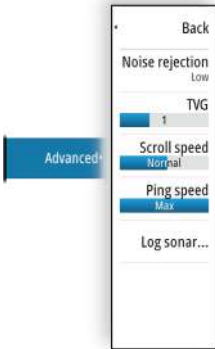
**4.** Continue selecting new measuring points if required

Use menu options to re-position the start point and the end point as long as the measuring function is active.

Select the finish measuring menu option to resume normal image scrolling.

## Advanced options

The Advanced menu option is only available when the cursor is not active.



### Noise rejection

Filters out signal interference and reduces on-screen clutter.

### TVG

Wave action and boat wakes can cause onscreen clutter near the surface. The TVG (Time Variable Gain) option reduces surface clutter by decreasing the sensitivity of the receiver near the surface.

### Scroll speed

You can select the scrolling speed of the image on the screen. A high scroll speed updates the image fast, while a low scroll speed presents a longer history.

→ **Note:** In certain conditions it may be necessary to adjust the scroll speed to get a more useful image. Such as adjusting the image to a faster speed when vertically fishing without moving.

### Ping Speed

Ping speed controls the rate the transducer transmits the signal into the water. By default, the ping speed is set to max. It may be necessary to adjust the ping speed to limit interference.

### Log sonar

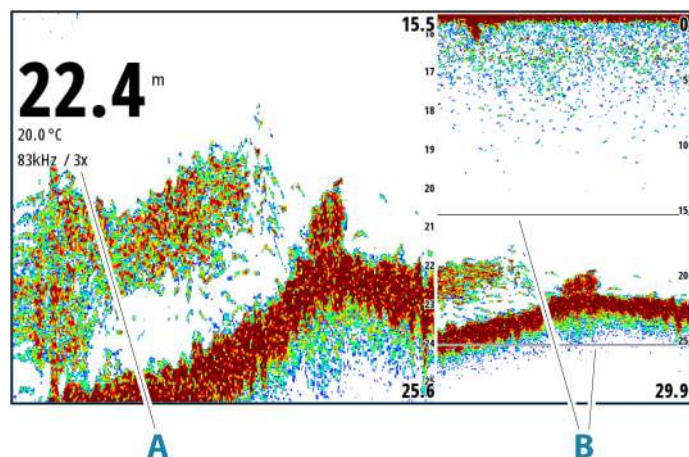
Select to start and stop recording of echosounder log data. For more information, refer to "Recording log data" on page 66.

## More options



### Split screens

### Zoom



**A** Zoom level

## B Zoom bars

The Zoom mode presents a magnified view of the sonar image on the left side of the panel.

By default, the zoom level is set to 2x. You can select up to 8x zoom.

The range zoom bars on the right side of the display shows the range that is magnified. If you increase the zooming factor the range is reduced. You see this as reduced distance between the zoom bars.

Move the zoom bars up/down on the image to view different depths of the water column.

### **Bottom lock**

The bottom lock mode is useful when you want to view targets close to the bottom. In this mode, the left side of the panel shows an image where the bottom is flattened. The range scale is changed to measure from the seabed (0) and upwards. The bottom and the zero line are always shown on the left image, independent of the range scale. The scaling factor for the image on the left side of the panel is adjusted as described for the Zoom option.

### **Palettes**

Used for selecting the image's color palette.

### **Temperature graph**

The temperature graph is used to illustrate changes in water temperature.

When toggled on, a colored line and temperature digits are shown on the image.

### **Depth line**

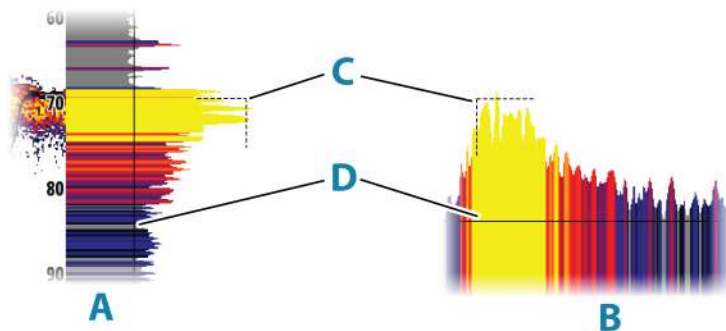
When toggled on, a line is shown on the bottom surface. The depth line makes easier to distinguish the bottom from fish and structures.

### **Amplitude scope**

The amplitude scope is a display of an echo sounding on the panel. The strength of the actual echoes are indicated by both width and color intensity.

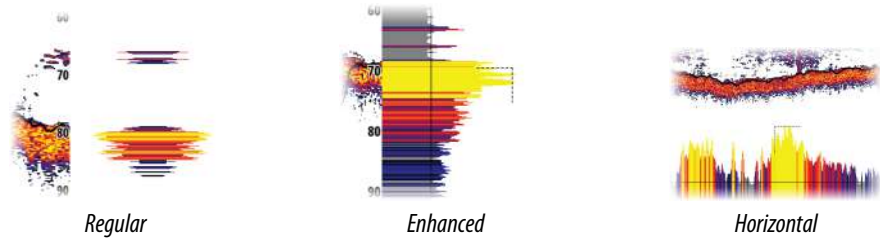
#### **Enhanced and horizontal amplitude scope indicators**

The enhanced and horizontal amplitude scope show 2 indicators:



- A** Enhanced amplitude scope image
- B** Horizontal amplitude scope image
- C** Cross indicator - indicates where in the echo sounding the bottom is located.
- D** Threshold line - indicator of the current gain. It tells you the amplitude of the return echo displayed on the panel. The gain setting helps to distinguish return echoes between echo targets and noise.

## Amplitude scope options



### Off

Removes the amplitude scope from the panel.

### Regular

Displays the amplitude scope vertically on the side of the panel. There are no customizable options to the appearance of the regular amplitude scope display.

If the cursor is placed on the panel, the amplitude scope continues to display the newest echo sounding as it appears on the panel.

### Enhanced

Displays the amplitude scope vertically on the side of the panel. Select the appearance menu option to change the enhanced amplitude scope display.

If the cursor is placed on the panel, the amplitude scope displays the echo sounding at the cursor.

### Horizontal

Displays the amplitude scope horizontally at the bottom of the panel. Select the appearance menu option to change the horizontal amplitude scope display.

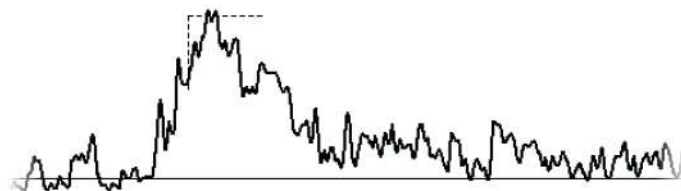
If the cursor is placed on the panel, the amplitude scope displays the echo sounding at the cursor.

### Appearance

The appearance menu option is available when the amplitude scope is set to enhanced or horizontal.

### Line

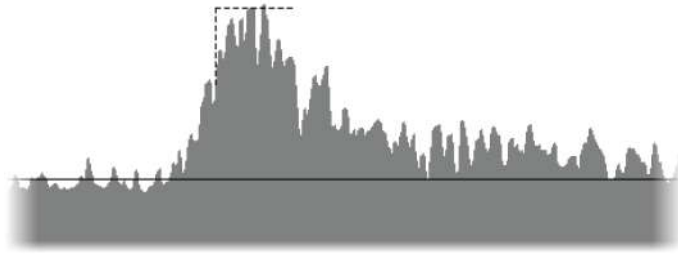
Displays the amplitudes as a single line.



### Fill

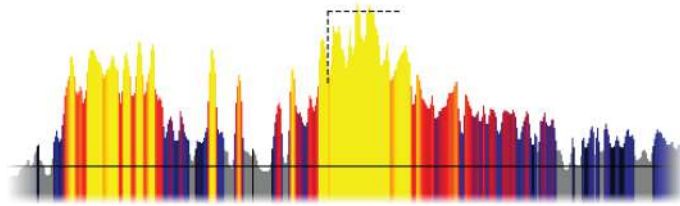
Illustrates the amplitudes with a gray fill color.





### Color

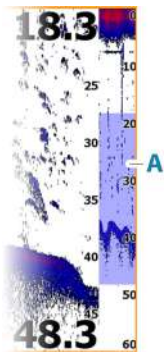
Displays each amplitude value with the same color as in the panel. For amplitudes close to or below the gain threshold, the color is gray. The gray amplitudes indicate no echo target returns. The gray amplitudes replace the background color that is shown on the panel which also indicates no echo targets.



### Zoom bar

The zoom bar (A) is displayed when you zoom the image.

Drag the zoom bar vertically to view different parts of the water column.



### Overlay DownScan

When a DownScan capable transducer is connected to your system, you can overlay DownScan images on the regular Echosounder image.

When overlay DownScan is activated, the Echosounder panel menu expands to include basic DownScan options.

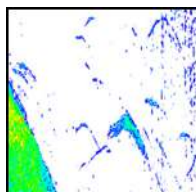
### Pause

Pauses the image, allowing you to examine the image in detail.

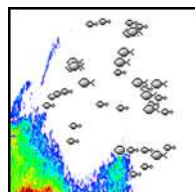
The pause function stops the echosounder from pinging. The system is not collecting data when paused in this manner.

### Fish ID

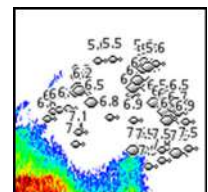
You can select how you want the fish targets to appear on the screen. You can also select if you want to be notified by a beep when a fish ID appears on the panel.



*Traditional fish arches*



*Fish symbols*



*Fish symbols and depth indication*

→ **Note:** Not all fish symbols are actual fish.

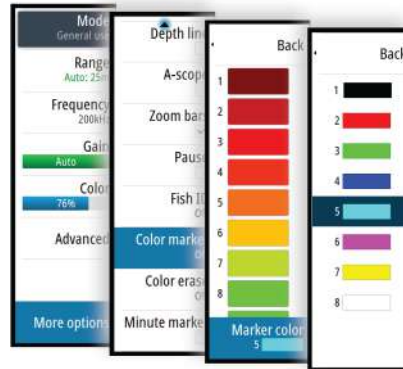
### Color marker

This option allows you to change certain colors on the image.

→ **Note:** Only the colors above the sea floor are changed in the image.

## Changing colors

→ **Note:** Use carefully, some color changes can hide obstructions and other objects.



1. Select the color marker menu option
2. Select one or more colors you want to change
3. Select the marker color menu option to display replacement colors
4. Select the replacement color
5. Select the back menu option to save your changes.

When color changes are applied, the color marker menu option changes from off to showing a color bar.



If the palette is changed, the color changes are applied to it. However, if white is selected for a dark background palette, then changing to a palette with a light background will automatically turn the replacement color to black. If a dark color is selected on a light background image, it will change to white if the palette is changed to a dark color background.

## Removing color changes

To remove color changes, select the color marker menu option and then de-select the color. Remove all color changes to turn the color marker feature off.

## Color erase

Erases specific colors on the image so the palette background color is shown in their place. This effectively hides the selected colors on the image.



→ **Note:** Use carefully, some color changes can hide obstructions and other objects.

1. Select the color erase menu option
2. Select one or more colors you want to erase. The color selected will change to white in the menu. The color selected will be removed from the image and the palette background color shown instead.
3. Select the back menu option to save your changes.

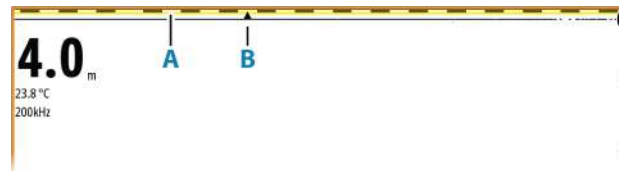
When color erase is applied, the color erase menu option changes from off to showing a color bar.



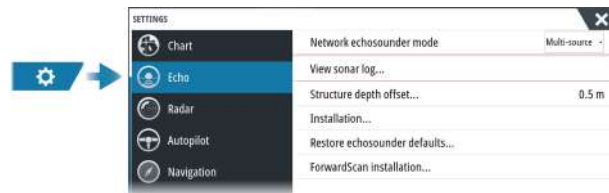
Remove all color changes to turn the color erase feature off.

### Minute marker

Determines if the minute marker line (A) is shown on the image. Each black and each white stripe in the line represents 1 minute. If there is a discontinuity in the signal, this is indicated with a triangle (B).



## Echosounder settings



### Internal Echosounder

When selected, the internal echosounder is available for selection in the echosounder panel menu.

When unselected, this option disables the internal echosounder in the unit. It will not be listed as an echosounder source for any unit on the network. Unselect this option on units which do not have a transducer connected.

### Network Echosounder

Select to share transducers from this unit with other units connected on the Ethernet network. In addition, the setting must be selected in order to see other enabled sonar devices on the network.

When unselected, transducers connected to this unit cannot be shared with other units connected on the network, nor can it see other sources on the network that have this feature enabled.

For more information about how to setup the echosounder, refer to the separate Installation manual.

### Network echosounder mode

The network echosounder mode setting selects whether only one or multiple echosounder sources can be selected at the same time.

→ **Note:** Changing the mode requires that all connected sources are restarted.

### View sonar log

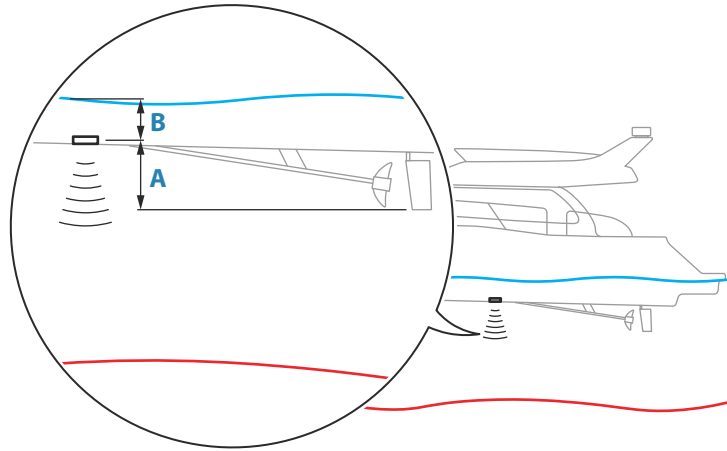
Used to view recordings. The log file is displayed as a paused image, and you control the scrolling and display from the menu.

You can use the cursor on the image, measure distance, and set view options as on a live image. If more than one channel was recorded in the selected log file, you can select which channel to display.



## Structure depth offset

All transducers measure water depth from the transducer to the bottom. As a result, water depth readings do not account for the distance from the transducer to the lowest point of the boat in the water or from the transducer to the water surface.



- To show the depth from the lowest point of the vessel to the bottom, set the offset equal to the vertical distance between the transducer and the lowest part of the vessel, **A** (negative value).
- To show the depth from the water surface to the bottom, set the offset equal to the vertical distance between the transducer and the water surface, **B** (positive value)
- For depth below transducer, set the offset to 0.

## Installation

Used for installation and setup. See the separate Installation manual.

## Restore echosounder defaults

Restore echosounder settings to the factory supplied defaults.

## ForwardScan installation

Available when the ForwardScan feature is connected.

For setup information, refer to "*ForwardScan installation settings*" on page 89.

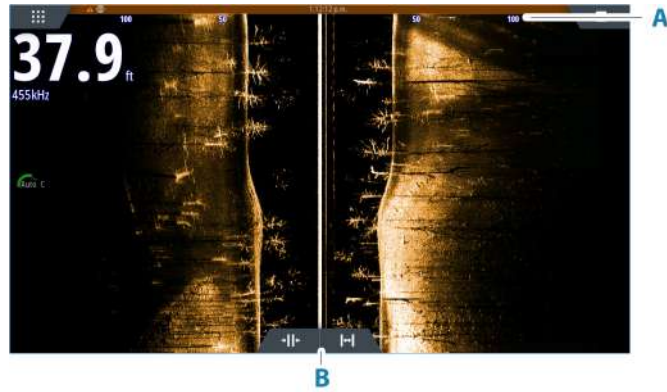
# 11

## SideScan

### About SideScan

SideScan provides a wide coverage in high detail of the seabed to the sides of your boat. The SideScan panel is available when a SideScan capable transducer is connected to the system.

### The SideScan panel



- A** Range scale
- B** Range icons

### Zooming the image

Use the range icons or change the range menu setting to specify the distance out to the left and right of the center displayed in the image. A change in the range causes a zoom in or out of the image.

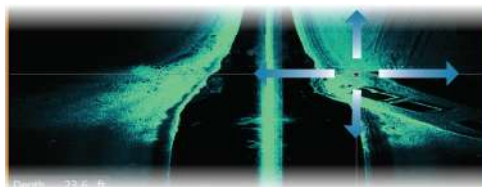
### Using the cursor on the panel

When you position the cursor on the panel, the image pauses and the cursor information window is activated. The left/right distance from the vessel to the cursor are shown at the cursor position.

### Viewing history

In a SideScan view, pan the image to see sides and history by maneuvering the image left, right, and up.

To resume normal SideScan scrolling, select the clear cursor option.



### Recording SideScan data

Displays the record log dialog. SideScan data can be recorded by selecting the correct file format (xtf) in the record dialog. For more information, refer to *"Recording log data"* on page 66.

## Setting up the image

Use the SideScan menu to set up the image. When the cursor is active, some options in the menu are replaced with cursor mode features. Select the clear cursor option to return to the normal menu.



### Source

→ **Note:** Available only if multiple sources with the same capability are available.

Used to specify the source for the image in the active panel.

You can display different sources simultaneously, using a multi-panel page configuration. Menu options for each panel are independent.

→ **Note:** Using transducers at the same frequency can cause interference.

For source setup information, refer to the NSO evo3S Installation Manual.

### Range

The range setting determines the distance out to the left and right of the center.

#### **Preset range levels**

Select a preset range level manually from the menu.

#### **Auto range**

In auto range, the system automatically displays the whole range from the water surface to the bottom.

Auto is the preferred setting for fish finding.

Select the range option and then the auto option in the menu.

### Frequencies

Two frequencies are supported. 800 kHz provides the sharpest image without sacrificing range. While 455 kHz can be used in deeper waters, or for expanded range capabilities.

### Contrast

Determines the brightness ratio between light and dark areas of the screen.

→ **Note:** We recommend that you use the auto contrast option.

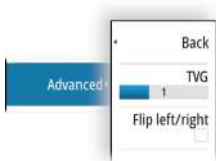
### Palettes

Used for selecting the image's color palette.

### View

Specifies if the SideScan page displays the left side of the image only, right side only, or left and right side at the same time.

## Advanced options



### TVG

Wave action and boat wakes can cause onscreen clutter near the surface. The TVG (Time Variable Gain) option reduces surface clutter by decreasing the sensitivity of the receiver near the surface.

### Flipping the image left/right

If required, flips the left/right side of the image to match the direction of the transducer installation.



## More options

### Pause

Pauses the image, allowing you to examine the image in detail.

The pause function stops the echosounder from pinging. The system is not collecting data when paused in this manner.

### Range Lines

Range lines can be added to the image to make it easier to estimate distance.

### Recording SideScan data

Displays the record log dialog. SideScan data can be recorded by selecting the correct file format (xtf) in the record dialog. For more information, refer to *"Recording log data"* on page 66.

## Echosounder settings

Use the echosounder settings dialog to make settings to your echosounder system. Refer to *"Echosounder settings"* on page 73.

# 12

## DownScan

### About DownScan

DownScan provides detailed images of structure and fish directly below your boat. The DownScan panel is available when a DownScan capable transducer is connected to the system.

### The DownScan panel



### Zooming the image

You can zoom the image.

The zoom level is shown on the image. If the cursor is active, the system zooms in where the cursor is positioned.

### Using the cursor on the panel

When you position the cursor on the panel, the image pauses and the cursor information window is activated. The depth of the cursor is shown at the cursor position.

### Viewing DownScan history

You can pan the image history by dragging the image to the left and right.

To resume normal DownScan scrolling, clear the cursor from the image.

### Recording DownScan data

Displays the record log dialog. DownScan data can be recorded by selecting the correct file format (xtf) in the record dialog. For more information, refer to *"Recording log data"* on page 66.

### Setting up the DownScan image

Use the DownScan menu to set up the image. When the cursor is active, some options in the menu are replaced with cursor mode features. Select the clear cursor menu option to return to the normal menu.

#### Source

→ **Note:** Available only if multiple sources with the same capability are available.

Used to specify the source for the image in the active panel.

You can display different sources simultaneously, using a multi-panel page configuration. Menu options for each panel are independent.

→ **Note:** Using transducers at the same frequency can cause interference.

For source setup information, refer to the NSO evo3S Installation Manual.

kHz / 4x



## Range

The range setting determines which water depth that is visible on the screen.

→ **Note:** Setting a deep range in shallow water may cause the system to lose track of the depth.

### **Preset range levels**

Select a preset range level manually from the menu.

### **Auto range**

In auto range, the system automatically displays the whole range from the water surface to the bottom.

Auto is the preferred setting for fish finding.

Select the range option and then the auto option in the menu.

## Frequencies

Two frequencies are supported. 800 kHz provides the sharpest image without sacrificing range. While 455 kHz can be used in deeper waters, or for expanded range capabilities.

## Contrast

Determines the brightness ratio between light and dark areas of the screen.

→ **Note:** We recommend that you use the auto contrast option.

## Palettes

Used for selecting the image's color palette.

## FishReveal

Select FishReveal to display fish arches in the image.

When FishReveal is enabled, the menu expands to include FishReveal options.

### **Gain**

Controls the sensitivity of the FishReveal data on the DownScan image. Increasing gain shows more detail on the screen. Decreasing gain displays less. Too much detail clutters the screen. If the gain is set too low, weak fish arch data might not be displayed.

### **Color**

Adjusts the colors of the fish arch data to help differentiate them from other targets.

Adjusting the color can help separate fish and important structures on or near the bottom from the actual bottom.

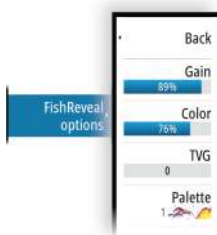
### **TVG**

Wave action and boat wakes can cause onscreen clutter near the surface. The TVG (Time Variable Gain) option reduces surface clutter by decreasing the sensitivity of the receiver near the surface.

### **Palette**

Select between several display palettes optimized for a variety of fishing conditions.

→ **Note:** Palette choice is often a user preference, and may vary depending on the fishing conditions. It is best to select a palette that provides good contrast between the image details and FishReveal arches.



## Advanced options

## TVG

Wave action and boat wakes can cause onscreen clutter near the surface. The TVG (Time Variable Gain) option reduces surface clutter by decreasing the sensitivity of the receiver near the surface.

## More options



### Pause

Pauses the image, allowing you to examine the image in detail.

The pause function stops the echosounder from pinging. The system is not collecting data when paused in this manner.

### FishReveal option

When FishReveal is enabled, displays fish arches in the image. Refer to *"FishReveal"* on page 79.

### Range lines

Range lines can be added to the image to make it easier to estimate depth.

### Recording DownScan data

Displays the record log dialog. DownScan data can be recorded by selecting the correct file format (xtf) in the record dialog. For more information, refer to *"Recording log data"* on page 66.

## Echosounder settings

Use the echosounder settings dialog to make settings to your echosounder system. Refer to *"Echosounder settings"* on page 73.

# 13

## 3D Sonar

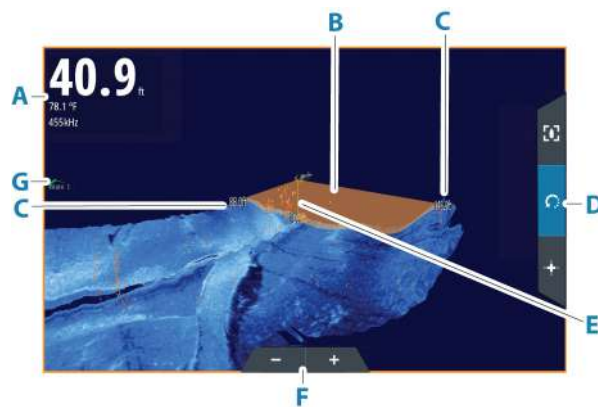
### About 3D Sonar

3D Sonar is a multi-beam sonar technology that allows anglers to see fish, underwater structures and bottom contours in customizable, three-dimensional views.

The 3D Sonar page is available when a 3D Sonar capable transducer is connected to the system.

### The 3D panel

In 3D view, the sea floor image is built up in real-time directly under the vessel as the boat moves. If you are not moving the image will remain stagnant. You can also see other underwater objects and clusters of fish. The 3D view shows both the left and right channels of data.



- A** Depth, temperature, and frequency
- B** Transducer beam
- C** Range
- D** 3D panel buttons
- E** Depth indication line
- F** Zoom panel buttons
- G** Contrast

### Zooming the image

You can zoom the image.

The zoom level is shown on the image. If the cursor is active, the system zooms in where the cursor is positioned.

### Using the cursor on a 3D image

By default, the cursor is not shown on the image.

On a 3D image, select the Cursor Enable panel button to use the cursor.

When the cursor is positioned on an image, the cursor information window and the history bar are activated.

The cursor information window shows available data at the cursor position, including the distance and range from the vessel to the cursor position.

The history bar is used to pan back in the stored data. The highlighted part of the History bar shows the image you are currently viewing in relation to the total image history stored. Refer to "Viewing image history" on page 82.

→ **Note:** The history bar can be turned off. Refer to "Clear live history" on page 84.

kHz / 4x

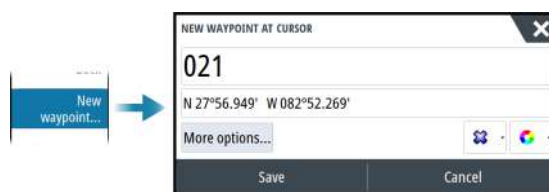


Depth 42.00 ft  
Temp 32.0 °F  
N 30°25.627'  
W 81°14.483'  
519 ft, 277 °M



## Saving waypoints

To save a waypoint, position the cursor on the panel and then select the new waypoint menu option.



If the cursor is positioned on a 3D image, no depth information is included for the waypoint. The waypoint on a 3D image is drawn with a line beneath it to indicate its point on the sea floor.

## 3D mode options

There are two modes for the 3D panel:

- Vessel mode
- Cursor mode

Switch between vessel mode and cursor mode by selecting the 3D panel buttons. You can also return from cursor mode to vessel mode by selecting the clear cursor menu option.

### 3D vessel mode

In this mode, the view is locked to the vessel, and the image moves with the vessel.

The camera can be rotated around the vessel, and the camera elevation changed to look down or look more sideways from the vessel:

- To change the camera rotation, drag horizontally on the screen
- To change the camera elevation and tilt, drag vertically on the screen



### 3D cursor mode

When you activate cursor mode, the camera position is the same as when cursor mode was enabled.

In cursor mode, the image does not move with the vessel. The image can be zoomed, and the camera can be rotated in any direction by dragging on the screen.

Cursor mode includes the cursor functions described in *"Using the cursor on a 3D image"* on page 81.



## Fish renderings

When objects are identified in the water column, they are shown as clusters of dots. The point color corresponds to the target intensity, and the point colors are automatically adjusted to complement the chosen palette.



## Viewing image history

The highlighted part of the history bar shows the image you are currently viewing in relation to the total image history stored.

The history bar appears by default when the cursor is active. You can turn off the history bar, have it always shown at the top of the screen, or have it appear only when the cursor is active. Refer to *"Clear live history"* on page 84.

The history bar is at the top of the screen on 3D images.

You pan the image history by dragging on the image, or by dragging the highlighted region of the history bar.

To resume scrolling showing current data, clear the cursor.



## Setting up the image

### Source

→ **Note:** Available only if multiple sources with the same capability are available.

Used to specify the source for the image in the active panel.

You can display different sources simultaneously, using a multi-panel page configuration. Menu options for each panel are independent.

→ **Note:** Using transducers at the same frequency can cause interference.

For source setup information, refer to the NSO evo3S Installation Manual.

### Range

The range setting determines the distance out to the left and right of the center.

#### **Preset range levels**

Select a preset range level manually from the menu.

#### **Auto range**

In auto range, the system automatically displays the whole range from the water surface to the bottom.

Auto is the preferred setting for fish finding.

Select the range option and then the auto option in the menu.

### Frequencies

Two frequencies are supported. 800 kHz provides the sharpest image without sacrificing range. While 455 kHz can be used in deeper waters, or for expanded range capabilities.

### Contrast

Determines the brightness ratio between light and dark areas of the screen.

→ **Note:** We recommend that you use the auto contrast option.

### Palettes

Used for selecting the image's color palette.

## Advanced options



### TVG

Wave action and boat wakes can cause onscreen clutter near the surface. The TVG (Time Variable Gain) option reduces surface clutter by decreasing the sensitivity of the receiver near the surface.

### Flipping the image left/right

If required, flips the left/right side of the image to match the direction of the transducer installation.

### Vertical enhancement

This option stretches the data so that the differences between depths are greater on the panel, which help you to see the changes in depth in relatively shallow areas.

### Target sensitivity

This setting adjusts how many and what intensity points are included in the water column. Turn it down to see less noise or things you don't want to see, and turn it up to see more information.

The Auto option automatically adjusts the settings to the optimal levels. Auto sensitivity can be adjusted (+/-) to your preference while still maintaining the auto sensitivity functionality.

## More options



### Pause

Pauses the image, allowing you to examine the image in detail.

The pause function stops the echosounder from pinging. The system is not collecting data when paused in this manner.

### Clear live history

Clears existing live history data from the screen and begins showing only the most current data.

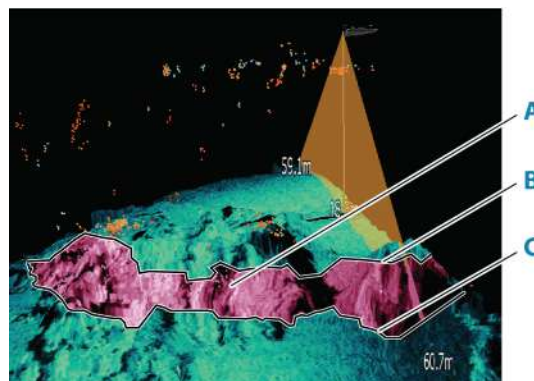
### View lock

When enabled, the camera will maintain the set relative rotation from the vessel. For example, if you rotate to face the starboard side of the vessel, the camera will rotate to maintain the starboard view when the vessel rotates.

### Depth highlighting

Highlights (A) the specified depth range. The low limit sets the shallowest depth of the range to be highlighted (B). The high limit sets the deepest depth of the range to be highlighted (C).

The highlight color depends on the color of the selected palette.



## Echosounder settings

Use the echosounder settings dialog to make settings to your echosounder system. Refer to "Echosounder settings" on page 73.

# 14

## StructureMap

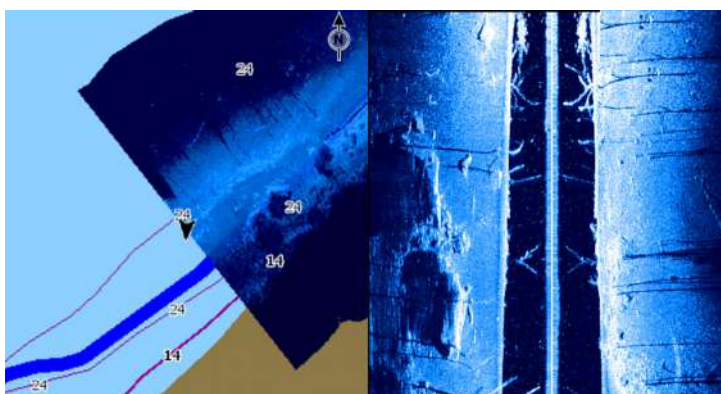
### About StructureMap

The StructureMap feature overlays SideScan images from a SideScan source on the map. This makes it easier to visualize the underwater environment in relation to your position, and aids in interpreting SideScan images.

### The StructureMap image

StructureMap can be displayed as an overlay on your chart panel. When StructureMap overlay is selected, the chart menu increases to show the StructureMap options.

The example below shows a chart panel with Structure overlay, combined with a traditional SideScan panel.



### StructureMap sources

Two sources can be used to overlay Structure logs on the charts, but only one can be viewed at a time:

- Live data - Used when SideScan data is available
- Saved files - recorded SideScan data that are converted to StructureMap (\*.smf) format

#### Live data

When live data is selected, the SideScan imaging history is displayed as a trail behind the vessel icon. The length of this trail varies depending on available memory in the unit and range settings. As the memory fills up, the oldest data is automatically deleted as new data is added. When increasing the search range, the ping speed of the SideScan transducer is reduced, but the width and the length of the image history is increased.

→ **Note:** Live mode does not save any data. If the unit is turned off, all recent data is lost.

#### Saved files

Saved mode is used to review and examine StructureMap files, and to position the vessel on specific points of interest on a previous scanned area. Saved files can be used as source if no SideScan sources are available.

With this mode selected, the StructureMap file is overlaid on the map based on position information in the file.

If the chart scale is large, the StructureMap area is indicated with a boundary box until the scale is large enough to show Structure details.

→ **Note:** When saved files are used as the source, all StructureMap files found on the storage device and in the system's internal memory are displayed. If there is more than one StructureMap of the same area, the images overlap and clutter the chart. If several logs of the same area are required, the maps should be put on separate storage devices.

## StructureMap tips

- To get a picture of taller structures (a wreck, etc.) — do not drive over it, instead, steer the boat so the structure is on the left or right side of your vessel.
- Do not overlap history trails when conducting a side-by-side scan of an area.

## Using StructureMap with mapping cards

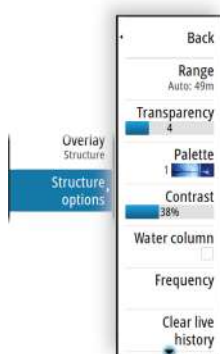
StructureMap allows you to maintain full chart capability and can be used with preloaded cartography as well as C-MAP, Navionics, and other third-party charting cards compatible with the system.

When using StructureMap with mapping cards, copy the StructureMap (.smf) files to the unit's internal memory. We recommend keeping copies of StructureMap files on external mapping cards.

## Structure options

You adjust the StructureMap settings from the Structure options menu. The menu is available when Structure overlay is enabled.

Not all options are available when saved StructureMap files are used as the source. Unavailable options are greyed.



### Range

Sets the search range.

### Transparency

Sets the opaqueness of the Structure overlay. With minimum transparency settings, the chart details are almost hidden by the StructureMap overlay.

### Palettes

Used for selecting the image's color palette.

### Contrast

Determines the brightness ratio between light and dark areas of the screen.

### Water column

Shows/hides the water column in Live mode.

If turned OFF schools of bait fish might not be seen on the SideScan image.

If turned ON the accuracy of the SideScan image on the map might be affected by the water depth.

### Frequencies

Two frequencies are supported. 800 kHz provides the sharpest image without sacrificing range. While 455 kHz can be used in deeper waters, or for expanded range capabilities.

### Clear live history

Clears existing live history data from the screen and begins showing only the most current data.

### Log sonar data

Displays the log sonar dialog. Refer to "Recording log data" on page 66.

### Source

Determines the StructureMap source displayed on the chart overlay. Refer to "StructureMap sources" on page 85.

# 15

## ForwardScan

### About ForwardScan

ForwardScan sonar is a navigational aid that helps you monitor the underwater environment in front of your vessel while carrying out slow speed maneuvers.

To use the ForwardScan feature you must have a ForwardScan transducer mounted on your vessel.

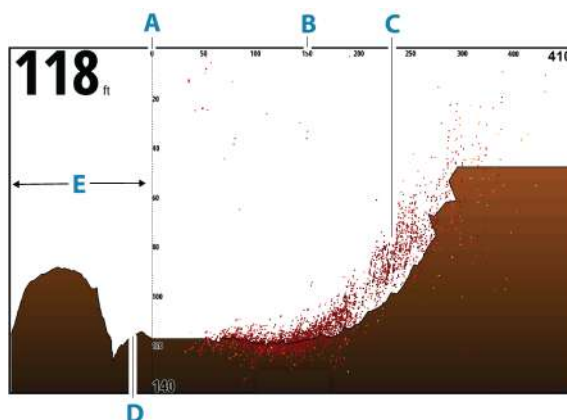
The ForwardScan transducer must be connected to a compatible sonar module (or another unit which has built-in sonar shared over the network).

If you have both a sonar/CHIRP and a ForwardScan transducer connected to different sonar modules (or another unit which has built-in sonar shared over the network), you can view both simultaneously on a single device.

**⚠ Warning:** Do not rely on this equipment as your principle source of navigation or hazard detection.

**⚠ Warning:** Do not use this equipment to gauge depth or other conditions for swimming or diving.

### The ForwardScan image



- A** Depth range scale and vessel position
- B** Forward range scale
- C** Point data
- D** Bottom
- E** Depth history

### Setting up the ForwardScan image

#### Source

→ **Note:** Available only if multiple sources with the same capability are available.

Used to specify the source for the image in the active panel.

You can display different sources simultaneously, using a multi-panel page configuration. Menu options for each panel are independent.

→ **Note:** Using transducers at the same frequency can cause interference.

For source setup information, refer to the NSO evo3S Installation Manual.



## Depth

Controls depth range. Depth range is set to auto mode by default.

## Forward range

Controls the forward looking search range. Maximum Forward range is 91 meters (300 feet).

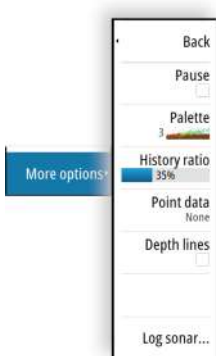
## Noise rejection

Filters out signal interference and reduces on-screen clutter.

## Show zones

Displays warning zones (yellow) and critical zones (red) on the screen. Refer to "*Critical forward range and Critical depth*" on page 89.

## More options



### Pause

Pauses the image, allowing you to examine the image in detail.

The pause function stops the echosounder from pinging. The system is not collecting data when paused in this manner.

### Palettes

Used for selecting the image's color palette.

### History ratio

Controls how much sonar history is shown behind the boat. The higher the ratio, the more history will be shown.

### Point data

By default, ForwardScan only shows the bottom. Select this option to specify to view no sonar data points, all data points, or only points (objects) in the water column.

### Depth lines

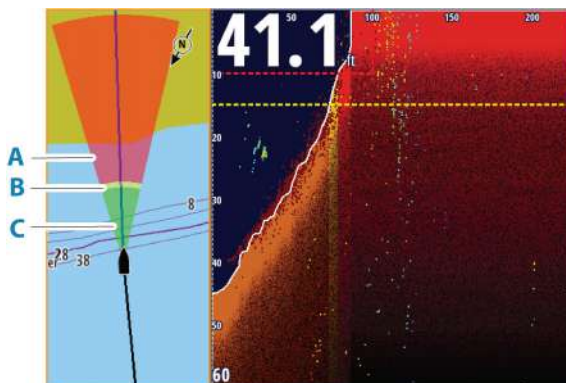
Displays lines on the screen that make it easier to quickly estimate depth and the underwater objects.

### Recording ForwardScan data

Displays the record dialog. ForwardScan log data can be recorded by selecting the correct file format (sl3) in the record dialog. For more information, refer to "*Recording log data*" on page 66.

## Heading extension

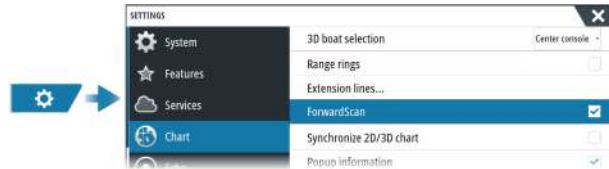
Use the chart heading extension to monitor ForwardScan on the chart panel. Heading extension colors are based on the ForwardScan alarm values.



- A** Red - Critical
- B** Yellow - Warning
- C** Green - Safe

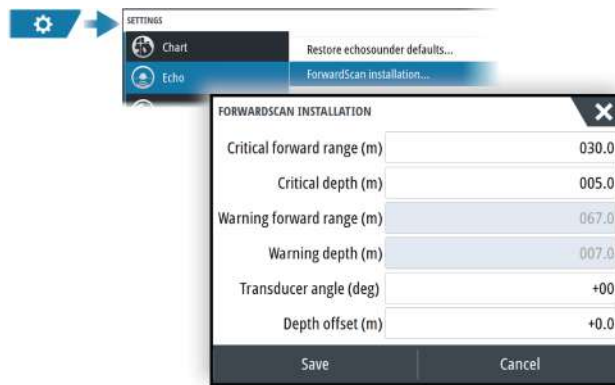
### Setting up ForwardScan extensions

Select ForwardScan in the chart settings dialog to view the ForwardScan heading extension on the chart panel.



### ForwardScan installation settings

Specify the setup in the ForwardScan installation dialog.



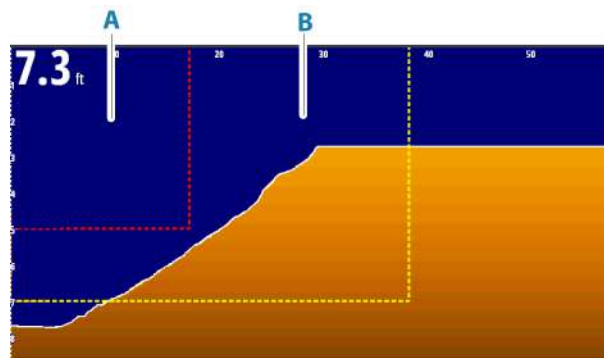
### Critical forward range and Critical depth

Critical Forward Range and Critical Depth are user-selected thresholds that define a critical zone forward of your vessel.

If the alarm is turned ON and you travel into water shallow enough to cross into the critical zone, the Critical Zone alarm is activated.

To receive Critical Zone alarms, enable the Forward range alarm in the Alarm settings dialog. For more information about enabling alarms, refer to "Alarms" on page 136.

You can show the critical warning zones on the image by activating the Show zones menu option.



- A** Critical zone
- B** Warning zone



## Warning forward range and warning depth

Set the warning forward range and warning depth thresholds that define the warning zone lines shown on the ForwardScan image.

## Offset angle

The offset angle is used to fine tune the transducer angle if the transducer is not installed parallel to the waterline.

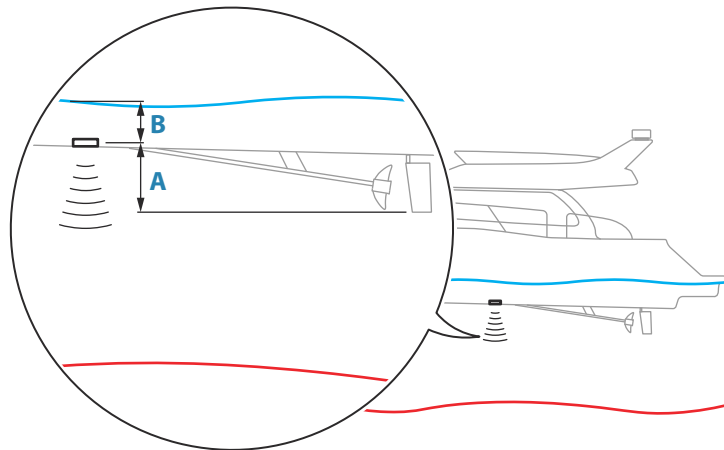
If the mounting angle of the transducer is off, the image can be misrepresented.

The angle can be adjusted from 0 (vertical) to 20°.

**⚠ Warning:** Adjustments to the offset angle value should be done with caution. Large variations in the offset angle value can distort depth data, increasing the risk of striking underwater obstructions.

## Depth offset

All transducers measure water depth from the transducer to the bottom. As a result, water depth readings do not account for the distance from the transducer to the lowest point of the boat in the water or from the transducer to the water surface.



- To show the depth from the lowest point of the vessel to the bottom, set the offset equal to the vertical distance between the transducer and the lowest part of the vessel, **A** (negative value).
- To show the depth from the water surface to the bottom, set the offset equal to the vertical distance between the transducer and the water surface, **B** (positive value)
- For depth below transducer, set the offset to 0.

# 16

## Autopilot

### Safe operation with the autopilot

⚠ **Warning:** An autopilot is a useful navigational aid, but DOES NOT replace a human navigator.

⚠ **Warning:** Ensure the autopilot has been installed correctly, commissioned and calibrated before use.

→ **Note:** For safety reasons a physical standby key should be available.

→ **Note:** The WheelKey can be configured to be a standby key. Refer to "*Configurable WheelKey*" on page 18.

Do not use automatic steering when:

- In heavy traffic areas or in narrow waters
- In poor visibility or extreme sea conditions
- When in areas where use of an autopilot is prohibited by law

When using an autopilot:

- Do not leave the helm unattended
- Do not place any magnetic material or equipment near the heading sensor used by the autopilot system
- Verify at regular intervals the course and position of the vessel
- Always switch the autopilot to standby and reduce speed in due time to avoid hazardous situations

### Autopilot alarms

For safety reasons it is recommended to turn on all autopilot alarms when operating the autopilot.

For more information, refer to "*Alarms*" on page 136.

### Selecting active autopilot

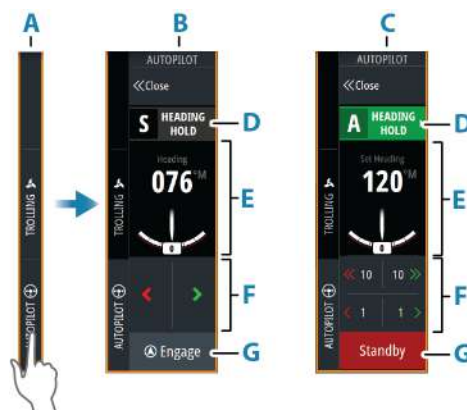
If both an autopilot computer and a trolling motor are configured for MFD control, only one of them can be active at a time.

Buttons for both autopilots are shown in the control bar.

Activate an autopilot by selecting the relevant button in the control bar, then select the switch button in the autopilot controller.



### The autopilot controller



A Control bar

- B** Autopilot controller, disengaged
- C** Autopilot controller, engaged
- D** Mode button
- E** Mode dependent information
- F** Mode dependent buttons
- G** Engage/Standby button

## Engaging and disengaging the autopilot

To engage the autopilot:

- Select the engage button to activate last active mode
- Select the mode button to display the list of available modes, then select the preferred mode



The autopilot will engage in the selected mode, and the autopilot controller will change to show active mode options.

To disengage the autopilot:

- Select the standby button

When the autopilot is in standby, the boat must be steered manually.

## Autopilot indication

The status bar shows autopilot information as long as an autopilot computer is connected.



## Autopilot modes

The autopilot has several steering modes. The number of modes and features within the mode depend on the autopilot computer, the boat type and available inputs.

### Non-Follow Up mode (NFU)

In this mode the port and starboard buttons are used to control the rudder.

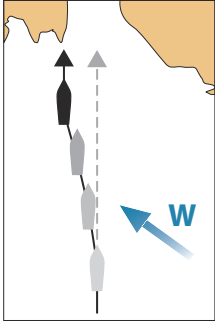
Activate this mode by selecting the port or starboard button when the autopilot is in standby.

### Follow-Up mode (FU)

In this mode the rudder moves to a set rudder angle. The rudder position is maintained at the set angle.

### To change the set rudder angle

- Select the port or starboard button



## Heading hold mode (A)

In this mode the autopilot steers the vessel on the set heading.

When the mode is activated, the autopilot selects the current compass heading as the set heading.

→ **Note:** In this mode the autopilot does not compensate for any drifting caused by current and/or wind (**W**).

### To change the set heading

- Select a port or starboard button

An immediate heading change takes place. The heading is maintained until a new heading is set.

### Tacking in Heading hold mode

→ **Note:** Only available when the boat type is set to sail (autopilot configuration).

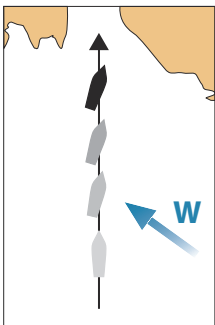
→ **Note:** Tacking should only be performed into the wind and must be tried out in calm sea conditions with light wind to find out how it works on your vessel.

Tacking in heading hold mode changes the heading by a fixed tack angle, either to port or starboard.

The rate of turn during the tack/gybe is set by the tack time in the autopilot settings dialog. Refer to "*Autopilot settings*" on page 98.

To initiate a tack:

- Selecting the tack button in the mode list, then selecting the tack direction.



## NoDrift mode

In NoDrift mode the vessel is steered along a calculated track line, from present position and in a direction set by the user.

When the mode is activated, the autopilot will draw an invisible track line based on current heading from the vessel's position. The autopilot will now use the position information to calculate the cross track distance, and automatically steer along the calculated track.

→ **Note:** If the vessel is drifting away from the track line due to current and/or wind (**W**), the vessel will follow the line with a crab angle.

### To change the set track line

- Select a port or starboard button

## NAV mode

**⚠ Warning:** NAV mode should only be used in open waters. Navigation mode must not be used while sailing, as course changes may result in unexpected tacks or gybes.

Prior to entering NAV mode you must be navigating a route or towards a waypoint.

In NAV mode the autopilot automatically steers the vessel to a specific waypoint location, or along a pre-defined route. Position information is used to change the course to steer to keep the vessel on the track line to the destination waypoint.

→ **Note:** For information about navigation, refer to "*Navigating*" on page 43.

### NAV mode options

While in NAV mode the following buttons are available in the autopilot controller:



#### Restart

Restarts the navigation from the vessel's current position.

### Skip

Skips the active waypoint and steers towards the next waypoint. This option is only available when navigating a route with more than one waypoint between the vessel position and the end of the route.

### Cancel

Cancels active navigation and deselects the current route or waypoint navigation. The autopilot is switched to heading hold mode, steering the vessel on the heading that was active when the cancel button was selected.

→ **Note:** This is different from selecting standby which does not stop current navigation.

### Turning in NAV mode

When the vessel reaches a waypoint, the autopilot will give an audible warning and display a dialog with the new course information.

There is a limit for the allowed automatic course change to next waypoint in a route:

- If the required course change to the next waypoint is less than the course change limit, the autopilot will automatically change the course
- If the required course change to next waypoint is more than the set limit, you are prompted to verify that the upcoming course change is acceptable. If the turn is not accepted, the vessel will continue with the current set heading.

The course change limit setting depends on the autopilot computer. Refer to the autopilot computer documentation.

### Wind mode

→ **Note:** Wind mode is only available when the boat type is set to Sail. It is not possible to activate wind mode if wind information is missing.

In wind mode the autopilot captures the current wind angle as steering reference, and adjusts the heading of the boat to maintain this wind angle.

The autopilot will keep the boat on the set wind angle until a new wind angle is set.

**⚠ Warning:** In wind mode the autopilot steers to the apparent or true wind angle and not to a compass heading. Any wind shift could result in the vessel steering on an undesired course.

### To change the set wind reference angle

- Select a port or starboard button
- With the autopilot controller active, turn the rotary knob

An immediate change of wind reference angle takes place.

### Tacking and gybing in wind mode

The tack/gybe option in wind mode mirrors the set wind angle on the opposite tack.

Tacking and gybing in wind mode can be performed when sailing with apparent or true wind as the reference. In either case the true wind angle must be less than 90° (tacking) and more than 120° (gybing).

The rate of turn during the tack/gybe is set by the tack time in the autopilot settings dialog. Refer to "*Autopilot settings*" on page 98.

To initiate a tack or gybe:

- Select the Tack/Gybe option in the mode list



## Turn patterns

The system includes a number of turn patterns, available when the autopilot is in auto mode. The number of turn patterns depend on autopilot computer.

→ **Note:** Turn patterns are not available if the boat type is set to sail.

### To start a turn

Select the port or starboard options in the turn dialog.

### Turn variables

All turn patterns, except the U-turn, have settings that you can adjust before you start a turn, or at any time when the boat is in a turn.

### U-turn

Changes the current set heading by 180°. When activated, the autopilot is switched to Auto mode.

The turn rate is identical to Turn rate setting.

### C-turn

Steers the vessel in a circle.

Turn variable:

- Rate of turn. Increasing the value makes the vessel turn a smaller circle.

### Spiral

Makes the vessel turn in a spiral with a decreasing or increasing radius.

Turn variables:

- Initial radius
- Change/turn. If this value is set to zero, the boat will turn in a circle. Negative values indicate decreasing radius while positive values indicate increasing radius

### Zigzag

Steers the vessel in a zigzag pattern.

Turn variables:

- Course change
- Leg distance

### Square

Steers the vessel in a square pattern, doing 90° course changes.

Turn variable:

- Leg distance

### S-turn

Makes the vessel yaw around the main heading. When activated, the autopilot is switched to S-turns mode.

Turn variables:

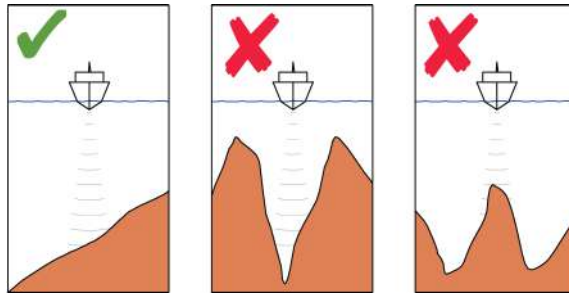
- Course change
- Turn radius

### Depth contour tracking

Makes the autopilot follow a depth contour.

→ **Note:** DCT turn pattern is only available if the system has a valid depth input.

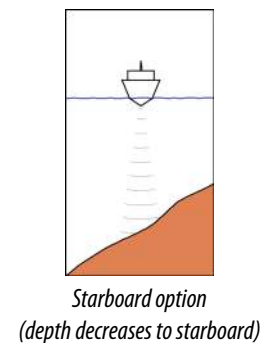
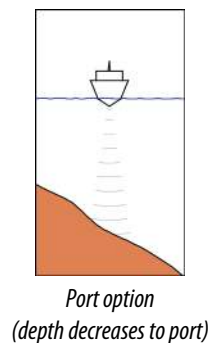
**⚠ Warning:** Do not use the DCT turn pattern unless the seabed is suitable. Do not use it in rocky waters where the depth is varying significantly over a small area.



→ **Note:** If depth data is lost during DCT the autopilot will automatically switch to auto mode. It is recommended to turn on the AP Depth Data Missing alarm when using DCT. When this alarm is activated an alarm will be raised if the depth data is lost during DCT.

#### To initiate a DCT turn

- Steer the boat to the depth you want to track, and in the direction of the depth contour
- Activate auto mode, then select depth contour tracking while monitoring the depth reading
- Select the port or starboard button to initiate the depth contour steering to follow the bottom sloping to starboard or to port



#### Turn variables

- Ref. depth: this is the reference depth for the DCT function. When DCT is initiated the autopilot reads the current depth and set this as the reference depth. The reference depth can be changed when the function is running
- Depth gain: this parameter determines the ratio between commanded rudder and the deviation from the selected depth contour. The higher depth gain value the more rudder is applied. If the value is too small it will take a long time to compensate for drifting off the set depth contour, and the autopilot will fail to keep the boat on the selected depth. If the value is set too high the overshoot will increase and the steering will be unstable.
- CCA: the CCA is an angle that is added to or subtracted from the set course. With this parameter you can make the boat yaw around the reference depth with S-movements. The larger the CCA the bigger yawing will be allowed. If the CCA is set to zero there is no S-ing.

## Operating a professional autopilot system

If the MFD system is connected to a professional autopilot system, the MFD can be used to operate the autopilot.

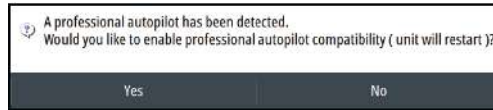
→ **Note:** The MFD cannot be used to configure or commission a professional autopilot system.

For more information about the autopilot system, refer to the separate documentation following the autopilot system.

### Autopilot sources

A professional autopilot system has its own source groups. If the MFD is going to be used to operate the professional autopilot system, the MFD must use the same source groups as the autopilot system.

The MFD will detect a connected professional autopilot system, and a prompt will be displayed asking if the MFD should enable professional autopilot compatibility.



- Yes: the MFD restarts using the same source groups as the professional autopilot, and the MFD can be used to operate the autopilot
- No: the MFD remains with its own source groups. The MFD cannot be used to operate the autopilot

If No is selected the question is not asked again. The setting can be changed by selecting Professional autopilot compatibility in the Advanced settings dialog.

### The autopilot controller for professional autopilots

The controller for professional autopilot has additional buttons and fields available.



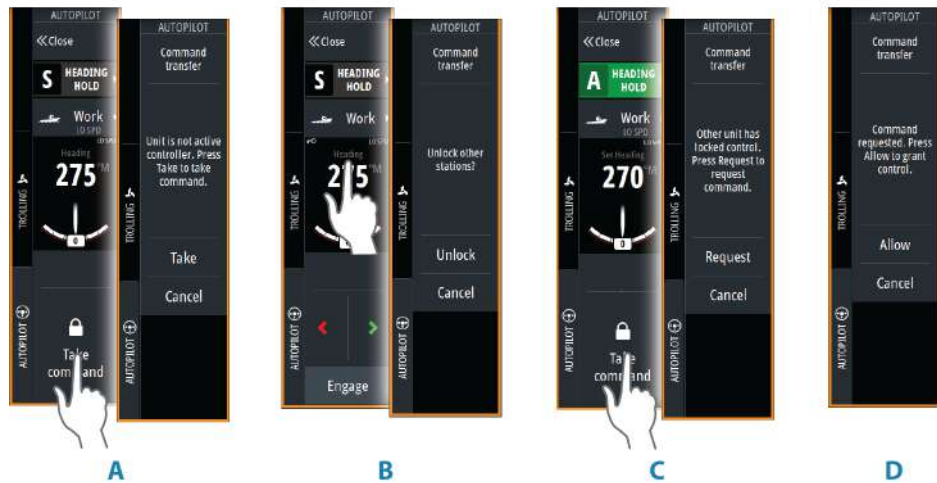
- A** Thruster indication
- B** Work profile button

### Command transfer

The AP70/80 system can be set up as a Master system or as an Open system. These options control the command transfer between control units in the autopilot system. For details, refer to the AP70/80 Operator manual.

The command transfer action and request depends on system setup and status of the autopilot controller as illustrated below.








- A** Passive unit – open system: request command by selecting the Take command button
  - The command is immediately transferred
- B** Unlocked unit: lock/unlock other units by selecting the information field
- C** Locked unit: request command by selecting the Take command button
  - A request is sent to the unit in control
- D** Unit in control: confirm request for command transfer
  - The command is transferred when the requestor confirms take-over

### Enabling/disabling thrusters

If a thruster is available for autopilot control, the Thruster button is shown in the autopilot control bar. The button has the following indications and function:

-  Disabled
  - Thruster available, but turned off.
  - Select to enable the thruster
-  Thruster in use. Red and green arrows indicate thrust direction.
  - Select to disable the thruster
-  Inhibited
  - Thruster available, but currently inhibited due to high speed.
  - Reduce vessel speed to enable the thruster

### Selecting a work profile

The AP70/AP80 supports multiple work profiles with different autopilot settings. On the MFD, the active work profile is shown on in the autopilot controller.

The Work profile button is available in the autopilot controller or in the autopilot controller's mode panel depending on MFD screen size.

To select the work profile:

- Select the work profile button to display the list of available work profiles, then select the preferred work profile

### Autopilot settings

The Autopilot settings dialog depends on which autopilot computer that is connected to the system. If more than one autopilot is connected, the Autopilot settings dialog shows option for the active autopilot.

The autopilot settings can be split between settings done by the user, and settings done during installation and commissioning of the autopilot system.

- [User settings](#) can be changed for various operational conditions or user preferences.
- [Installation settings](#) are defined during commissioning of the autopilot system. No changes should later be done to these settings.

The following sections describe the user settings per autopilot computer. For installation settings, refer to the installation manual.

## Common user settings

The following user settings are common to all autopilots.

### Chart compass

Select to display a compass symbol around your boat on the chart panel. The compass symbol is off when the cursor is active on the panel.



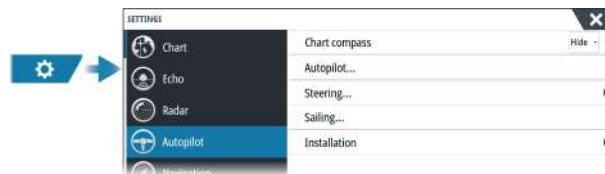
## NAC-1 specific user settings



### Steering response

Used to increase or decrease the steering sensitivity. A low response level reduces the rudder activity and provides a more loose steering. A high response level increases the rudder activity and provides more tight steering. A too high response level will cause the boat to make S movements.

## NAC-2/NAC-3 specific user settings



### Autopilot

Switches the view to the last active page.

### Steering

These options allow for manually changing low speed and high speed parameters that were set during the commissioning of the autopilot computer. For more details, refer to the separate documentation for the autopilot computer.

Selecting the low speed option or the high speed option opens dialogs the following parameters can be changed.

- Turn rate: Preferred turn rate used while turning in degrees per minute.
- Rudder gain: This parameter determines the ratio between commanded rudder and the heading error. The higher rudder value the more rudder is applied. If the value is too small it will take a long time to compensate for a heading error, and the autopilot will fail to keep a steady course. If the value is set too high the overshoot will increase and the steering will be unstable.
- Counter rudder: Relation between change in heading error and applied rudder. Higher counter rudder will reduce applied rudder faster when approaching the set heading.
- Auto trim: Controls how aggressively the autopilot will apply rudder to compensate for a constant heading offset, e.g. when external forces such as wind or current affects the heading. Lower auto trim will give faster, limitation of a constant heading offset.

→ **Note:** In VRF mode this parameter controls the time constant of the rudder estimate. A lower value makes the rudder estimate faster, i.e. that it will more quickly catch up with the boat's movements.

- Init rudder: Defines how the system moves the rudder when switching from manual steering to an automatic mode.
  - Rudder limit: Determines the maximum rudder movement in degrees from midship position that the autopilot can command the rudder in the automatic modes. The Rudder limit setting is only active during autosteering on straight courses, not during course changes. Rudder limit does not affect Follow-up or Non-Follow-up steering.
  - Off heading limit: Sets the limit for the off heading alarm. An alarm occurs when the actual heading deviates from the set heading more than the selected limit.
- Rudder limit: Determines the maximum rudder movement in degrees from midship position that the autopilot can command the rudder in the automatic modes. The Rudder limit setting is only active during autosteering on straight courses, not during course changes. Rudder limit does not affect Follow-up or Non-Follow-up steering.
- Off heading limit: Sets the limit for the off heading alarm. An alarm occurs when the actual heading deviates from the set heading more than the selected limit.
- Track response: Defines how fast the autopilot shall respond after having registered a cross track distance.
- Track approach angle: Defines the angle used when the vessel is approaching a leg. This setting is used both when you start navigating and when you use track offset.
- Course change confirm angle: Defines the limits for course change to next waypoint in a route. If the course change is more than this set limit, you are prompted to verify that the upcoming course change is acceptable.

### **Sailing**

→ **Note:** Sailing parameters are only available when the boat type is set to Sail.

This option allows for manually changing parameters that were set during the commissioning of the autopilot computer. For more details of the settings, refer to the separate documentation for the autopilot computer.

- Tack time: Controls the rate of turn (tack time) when performing a tack in wind mode.
- Tack angle: Controls the angle that the boat will tack to between 50° - 150° in Heading hold mode.
- Wind function: Select what wind function the autopilot will use when in wind mode.
  - Auto:
    - If TWA is <70°, Wind mode will use AWA.
    - If TWA is ≥70°, Wind mode will use TWA.
  - Apparent
  - True
- Manual speed: If neither boat speed or SOG data is available and or deemed reliable a manual value for speed source can be entered and used by the autopilot to aid steering calculations.

### **AC70/AC80 Specific user settings**

The AC70/AC80 computers do not have any specific user settings available in the MFD.

→ **Note:** The MFD cannot be used to configure or commission an AP70/AP80 system. For more information, refer to the documentation included with the autopilot system.

# 17

## Trolling motor autopilot

### Safe operation with the autopilot

⚠ **Warning:** An autopilot is a useful navigational aid, but DOES NOT replace a human navigator.

⚠ **Warning:** Ensure the autopilot has been installed correctly, commissioned and calibrated before use.

→ **Note:** For safety reasons a physical standby key should be available.

→ **Note:** The WheelKey can be configured to be a standby key. Refer to "*Configurable WheelKey*" on page 18.

Do not use automatic steering when:

- In heavy traffic areas or in narrow waters
- In poor visibility or extreme sea conditions
- When in areas where use of an autopilot is prohibited by law

When using an autopilot:

- Do not leave the helm unattended
- Do not place any magnetic material or equipment near the heading sensor used by the autopilot system
- Verify at regular intervals the course and position of the vessel
- Always switch the autopilot to standby and reduce speed in due time to avoid hazardous situations

### Autopilot alarms

For safety reasons it is recommended to turn on all autopilot alarms when operating the autopilot.

For more information, refer to "*Alarms*" on page 136.

### Selecting active autopilot

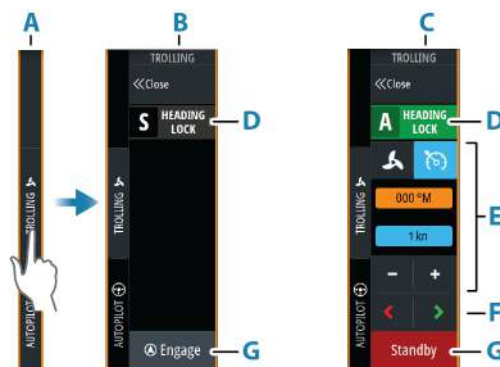
If both an autopilot computer and a trolling motor are configured for MFD control, only one of them can be active at a time.

Buttons for both autopilots are shown in the control bar.

Activate an autopilot by selecting the relevant button in the control bar, then select the switch button in the autopilot controller.



### The autopilot controller for trolling motor



- A** Control bar
- B** Autopilot controller, disengaged

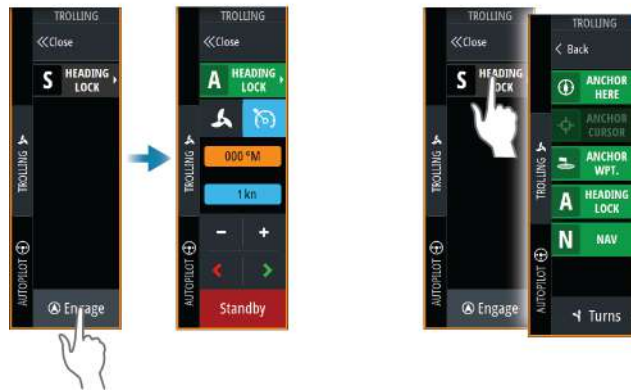
- C** Autopilot controller, engaged
- D** Mode button
- E** Mode dependent information
- F** Mode dependent buttons
- G** Engage/Standby button

When the autopilot controller is the active panel, it is outlined with a border.

## Engaging and disengaging the autopilot

To engage the autopilot:

- Select the engage button to activate last active mode
- Select the mode button to display the list of available modes, then select the preferred mode



The autopilot will engage in the selected mode, and the autopilot controller will change to show active mode options.

To disengage the autopilot:

- Select the standby button

When the autopilot is in standby, the boat must be steered manually.

## Autopilot indication



The status bar shows autopilot information as long as an autopilot computer is connected.

## Autopilot modes

The autopilot has several steering modes.

### Anchor modes

In these modes the trolling motor maintains the vessel position at a selected location.

→ **Note:** When in anchor mode, the vessel heading can be affected by wind or current.

The following anchor options are available:

#### Cursor

Navigates to cursor position, and then maintains the vessel at that position.

#### Waypoint

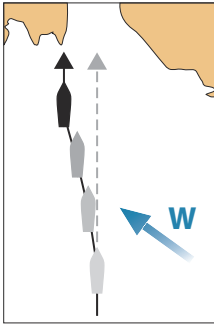
Navigates to the selected waypoint, and then maintains the vessel at that position.

#### Here

Maintains the vessel at the current position.

### Change the position in anchor mode

Use the arrow buttons to reposition the vessel when in anchor mode. Each press on a button will move the anchor position 1.5 m (5 ft) in the selected direction.



### Heading lock mode

In this mode the autopilot steers the vessel on the set heading.

When the mode is activated, the autopilot selects the current compass heading as the set heading.

→ **Note:** In this mode the autopilot does not compensate for any drifting caused by current and/or wind (**W**).

### To change the set heading

- Select a port or starboard button

An immediate heading change takes place. The heading is maintained until a new heading is set.

### NAV mode

**Warning:** NAV mode should only be used in open waters.

Prior to entering NAV mode you must be navigating a route or towards a waypoint.

In NAV mode the autopilot automatically steers the vessel to a specific waypoint location, or along a pre-defined route. Position information is used to change the course to steer to keep the vessel on the track line and to the destination waypoint.

When arriving at the destination, the autopilot switches to the selected arrival mode. It is important to select an arrival mode that fits your navigation needs before NAV mode is activated. Refer to "*Arrival mode*" on page 105.

### NAV mode options

While in NAV mode the following buttons are available in the autopilot controller:



#### Restart

Restarts the navigation from the vessel's current position.

#### Skip

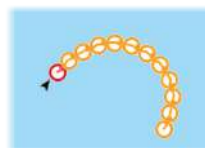
Skips the active waypoint and steers towards the next waypoint. This option is only available when navigating a route with more than one waypoint between the vessel position and the end of the route.

### Turn pattern steering

The system includes a number of automatic turn steering features.

When a turn pattern is activated, the system creates temporary waypoints on the turn.

The last waypoint on the turn is the final waypoint. When the vessel reaches the final waypoint, the vessel goes into arrival mode. Refer to "*Arrival mode*" on page 105.



### Starting a turn

- Select the port or starboard button





### **Turn variables**

All turn patterns have settings that you can adjust before you start a turn, or at any time when the boat is in a turn.

#### **U-turn**

Changes the current set heading by 180°.

Turn variable:

- Turn radius

#### **C-turn**

Steers the vessel in a circle.

Turn variable:

- Turn radius
- Degrees to turn

#### **Spiral**

Makes the vessel turn in a spiral with a decreasing or increasing radius.

Turn variables:

- Initial radius
- Radius change per loop
- Number of loops

#### **Zigzag-turn**

Steers the vessel in a zigzag pattern.

Turn variables:

- Course change per leg
- Leg distance
- Number of legs

#### **Square**

Steers the vessel in a square pattern, doing 90° course changes.

Turn variable:

- Leg distance
- Number of legs

#### **S-turn**

Makes the vessel yaw around the main heading.

Turn variables:

- Turn radius
- Course change
- Number of legs



## Trolling motor speed control

In Heading lock mode, Nav. mode and in Turn pattern steering the autopilot system can control the trolling motor speed.

The set target speed is displayed in the autopilot controller.

There are two ways to control the target speed of the trolling motor:

- Propeller rate, set as a percentage of power (A)
- Cruise control speed (B)

Switch between the speed options by selecting the speed icon.

The speed is increased/decreased in preset steps by selecting the plus and minus buttons.

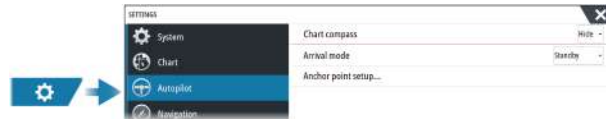
The speed can also be set manually by selecting the speed field (C).

## Recording and saving a track

A track can be saved as a route from the autopilot controller. If track recording is disabled, the function can be enabled from the autopilot controller.

For more information, refer to *"Waypoints, routes, and tracks"* on page 38.

## Autopilot settings



### Chart compass

Select to display a compass symbol around your boat on the chart panel. The compass symbol is off when the cursor is active on the panel.

### Select active autopilot

Selects if the autopilot controls the trolling motor or the outboard motor(s).

### Auto hide autopilot bar

Controls whether the autopilot information bar is shown when the autopilot is in standby.

### Arrival mode

The autopilot switches from navigation mode to the selected arrival mode when the vessel reaches the destination point.

### Standby

Disengages the autopilot. The trolling motor is controlled by hand-held remote or by foot pedal.

### Heading lock

Locks and maintains the last vessel heading.

### Anchor

Anchors the vessel at the destination point.

### Anchor point setup

The trolling motor can store a number of anchor points, labelled with MTG prefix. Anchor points in the trolling motor are displayed in the Anchor point dialog.

These MTG anchor points can be saved as a waypoint in the MFD system. The position of an MTG anchor point can be redefined to be identical to an existing waypoint, or to the current vessel position.



ANCHOR POINTS

Name	Position
MTGD001	N 50°52.100' W 1°22.000'
MTGD002	
MTGD003	
MTGD004	
MTGD005	
MTGD006	
MTGD007	
MTGD008	

ANCHOR POINT

Name  
MTGD001

Position  
N 50°52.100'  
W 1°22.000'

Save as waypoint...

Replace with waypoint...

Replace with here...

Show Goto

# 18

## Outboard autopilot

---

### Safe operation with the autopilot

⚠ **Warning:** An autopilot is a useful navigational aid, but DOES NOT replace a human navigator.

⚠ **Warning:** Ensure the autopilot has been installed correctly, commissioned and calibrated before use.

→ **Note:** For safety reasons a physical standby key should be available.

→ **Note:** The WheelKey can be configured to be a standby key. Refer to "*Configurable WheelKey*" on page 18.

Do not use automatic steering when:

- In heavy traffic areas or in narrow waters
- In poor visibility or extreme sea conditions
- When in areas where use of an autopilot is prohibited by law

When using an autopilot:

- Do not leave the helm unattended
- Do not place any magnetic material or equipment near the heading sensor used by the autopilot system
- Verify at regular intervals the course and position of the vessel
- Always switch the autopilot to standby and reduce speed in due time to avoid hazardous situations

### Autopilot alarms

For safety reasons it is recommended to turn on all autopilot alarms when operating the autopilot.

For more information, refer to "*Alarms*" on page 136.

### Selecting active autopilot

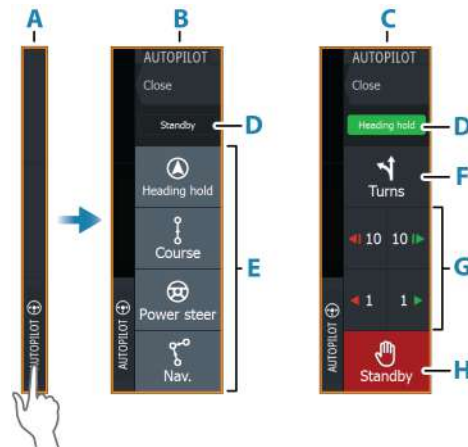
If both an autopilot computer and a trolling motor are configured for MFD control, only one of them can be active at a time.

Buttons for both autopilots are shown in the control bar.

Activate an autopilot by selecting the relevant button in the control bar, then select the switch button in the autopilot controller.



## The autopilot controller for outboard motors



- A** Control bar
- B** Autopilot controller, disengaged
- C** Autopilot controller, engaged
- D** Mode indication
- E** Mode buttons
- F** Turns button
- G** Mode dependent buttons
- H** Standby button

When the autopilot controller is the active panel, it is outlined with a border.

## Engaging and disengaging the autopilot

To engage the autopilot:

- Select the engage button to activate last active mode
- Select the mode button to display the list of available modes, then select the preferred mode



The autopilot will engage in the selected mode, and the autopilot controller will change to show active mode options.

To disengage the autopilot:

- Select the standby button

When the autopilot is in standby, the boat must be steered manually.

## Autopilot indication



The status bar shows autopilot information as long as an autopilot computer is connected.

## Autopilot modes

The autopilot has several steering modes. The number of modes and features within the mode depend on the autopilot computer, the boat type and available inputs.

### Non-Follow Up mode (NFU)

In this mode the port and starboard buttons are used to control the rudder.

Activate this mode by selecting the port or starboard button when the autopilot is in standby.

#### To change the rudder position

- Select a port or starboard button.

The rudder moves as long as the button is pressed.

### Heading hold mode (A)

In this mode the autopilot steers the vessel on the set heading.

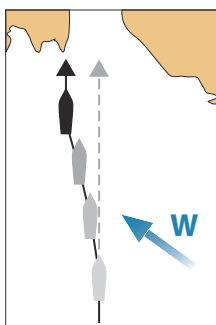
When the mode is activated, the autopilot selects the current compass heading as the set heading.

→ **Note:** In this mode the autopilot does not compensate for any drifting caused by current and/or wind (**W**).

#### To change the set heading

- Select a port or starboard button

An immediate heading change takes place. The heading is maintained until a new heading is set.



### NoDrift mode

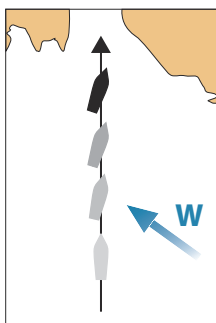
In NoDrift mode the vessel is steered along a calculated track line, from present position and in a direction set by the user.

When the mode is activated, the autopilot will draw an invisible track line based on current heading from the vessel's position. The autopilot will now use the position information to calculate the cross track distance, and automatically steer along the calculated track.

→ **Note:** If the vessel is drifting away from the track line due to current and/or wind (**W**), the vessel will follow the line with a crab angle.

#### To change the set track line

- Select a port or starboard button



### NAV mode

**⚠ Warning:** NAV mode should only be used in open waters. Navigation mode must not be used while sailing, as course changes may result in unexpected tacks or gybes.

Prior to entering NAV mode you must be navigating a route or towards a waypoint.

In NAV mode the autopilot automatically steers the vessel to a specific waypoint location, or along a pre-defined route. Position information is used to change the course to steer to keep the vessel on the track line to the destination waypoint.

→ **Note:** For information about navigation, refer to "Navigating" on page 43.



### NAV mode options

While in NAV mode the following buttons are available in the autopilot controller:

#### Restart

Restarts the navigation from the vessel's current position.

#### Skip

Skips the active waypoint and steers towards the next waypoint. This option is only available when navigating a route with more than one waypoint between the vessel position and the end of the route.

#### Cancel

Cancels active navigation and deselects the current route or waypoint navigation. The autopilot is switched to heading hold mode, steering the vessel on the heading that was active when the cancel button was selected.

→ **Note:** This is different from selecting standby which does not stop current navigation.

### Turning in NAV mode

When the vessel reaches a waypoint, the autopilot will give an audible warning and display a dialog with the new course information.

There is a limit for the allowed automatic course change to next waypoint in a route:

- If the required course change to the next waypoint is less than the course change limit, the autopilot will automatically change the course
- If the required course change to next waypoint is more than the set limit, you are prompted to verify that the upcoming course change is acceptable. If the turn is not accepted, the vessel will continue with the current set heading.

The course change limit setting depends on the autopilot computer. Refer to the autopilot computer documentation.

### Turn patterns

The system includes a number of turn patterns, available when the autopilot is in auto mode. The number of turn patterns depend on autopilot computer.

→ **Note:** Turn patterns are not available if the boat type is set to sail.

#### To start a turn

- Select the port or starboard button



### Turn variables

All turn patterns, except the U-turn, have settings that you can adjust before you start a turn, or at any time when the boat is in a turn.

#### U-turn

Changes the current set heading by 180°. When activated, the autopilot is switched to Auto mode.

The turn rate is identical to Turn rate setting.

### **C-turn**

Steers the vessel in a circle.

Turn variable:

- Rate of turn. Increasing the value makes the vessel turn a smaller circle.

### **Spiral**

Makes the vessel turn in a spiral with a decreasing or increasing radius.

Turn variables:

- Initial radius
- Change/turn. If this value is set to zero, the boat will turn in a circle. Negative values indicate decreasing radius while positive values indicate increasing radius

### **Zigzag**

Steers the vessel in a zigzag pattern.

Turn variables:

- Course change
- Leg distance

### **Square**

Steers the vessel in a square pattern, doing 90° course changes.

Turn variable:

- Leg distance

### **S-turn**

Makes the vessel yaw around the main heading. When activated, the autopilot is switched to S-turns mode.

Turn variables:

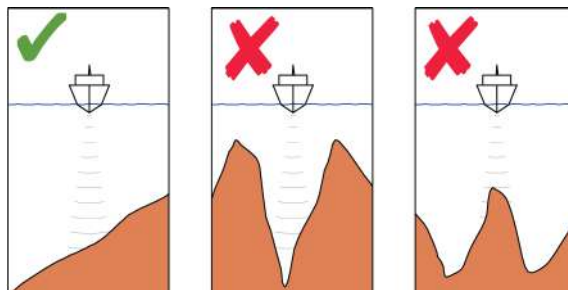
- Course change
- Turn radius

### **Depth contour tracking**

Makes the autopilot follow a depth contour.

→ **Note:** DCT turn pattern is only available if the system has a valid depth input.

**⚠ Warning:** Do not use the DCT turn pattern unless the seabed is suitable. Do not use it in rocky waters where the depth is varying significantly over a small area.

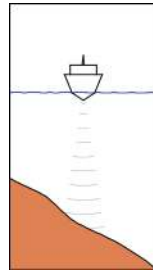


→ **Note:** If depth data is lost during DCT the autopilot will automatically switch to auto mode.

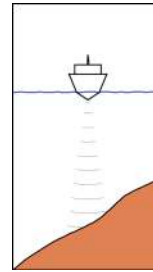
It is recommended to turn on the AP Depth Data Missing alarm when using DCT. When this alarm is activated an alarm will be raised if the depth data is lost during DCT.

### To initiate a DCT turn

- Steer the boat to the depth you want to track, and in the direction of the depth contour
- Activate auto mode, then select depth contour tracking while monitoring the depth reading
- Select the port or starboard button to initiate the depth contour steering to follow the bottom sloping to starboard or to port



*Port option  
(depth decreases to port)*



*Starboard option  
(depth decreases to starboard)*

### Turn variables

- Ref. depth: this is the reference depth for the DCT function. When DCT is initiated the autopilot reads the current depth and set this as the reference depth. The reference depth can be changed when the function is running
- Depth gain: this parameter determines the ratio between commanded rudder and the deviation from the selected depth contour. The higher depth gain value the more rudder is applied. If the value is too small it will take a long time to compensate for drifting off the set depth contour, and the autopilot will fail to keep the boat on the selected depth. If the value is set too high the overshoot will increase and the steering will be unstable.
- CCA: the CCA is an angle that is added to or subtracted from the set course. With this parameter you can make the boat yaw around the reference depth with S-movements. The larger the CCA the bigger yawing will be allowed. If the CCA is set to zero there is no S-ing.

## Autopilot settings

The Autopilot settings dialog depends on which autopilot computer that is connected to the system. If more than one autopilot is connected, the Autopilot settings dialog shows option for the active autopilot.



### Chart compass

Select to display a compass symbol around your boat on the chart panel. The compass symbol is off when the cursor is active on the panel.

### Select active autopilot

Selects if the autopilot controls the trolling motor or the outboard motor(s).

### Autopilot data sources

Provides automatic and manual data source selection for the outboard autopilot.

### Auto hide autopilot bar

Controls whether the autopilot information bar is shown when the autopilot is in standby.

### **Commissioning**

Used to calibrate your boat's steering (cable steer or hydraulic steering) with the NAC-1.

→ **Note:** The autopilot must be commissioned prior to first use and any time after autopilot default settings have been restored.

### **Steering response**

Used to increase or decrease the steering sensitivity. A low response level reduces the rudder activity and provides a more loose steering. A high response level increases the rudder activity and provides more tight steering. A too high response level will cause the boat to make S movements.



# 19

## Instruments

### About Instrument panels

The panels consist of multiple gauges that can be arranged on dashboards. The panels can be created with analog, digital, and bar gauges. Pre-defined dashboards and templates are included.

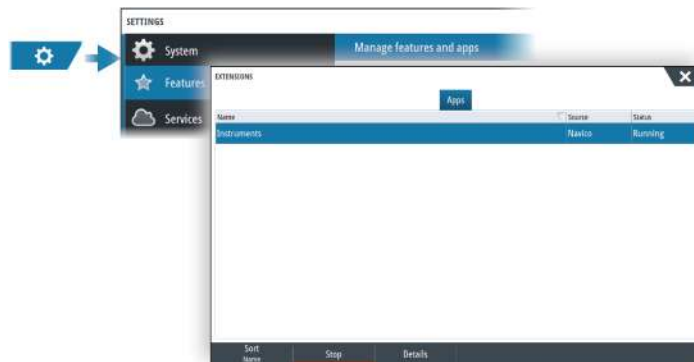
Example:



### Activating/deactivating feature applications

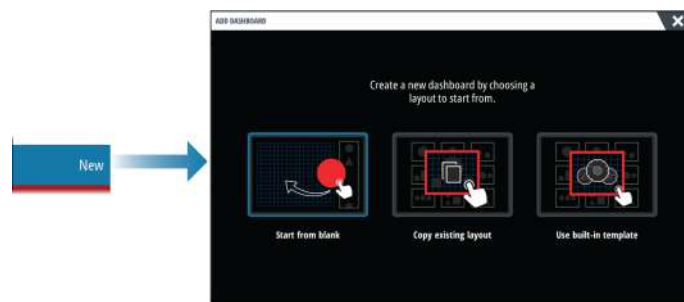
Use the system settings features option to activate/deactivate the application.

You can stop and then uninstall the feature from the manage features and apps option. This will remove the feature button from the home page. It can be installed again at a later date.



### Creating a dashboard

Use the new menu option to create your own dashboard.



### Starting from blank

Select to create your own dashboard from scratch.

Use menu options to name the dashboard and manage gauges on the dashboard.

## Copying an existing layout

Select to copy an existing layout that you have made.

Use menu options to name the dashboard and manage gauges on the dashboard.

## Using a built-in template

Select a pre-defined template to create a dashboard. The template dashboards reflect your vessel configuration.

Use menu options to name the dashboard and manage gauges on the dashboard.



## Customizing the dashboard

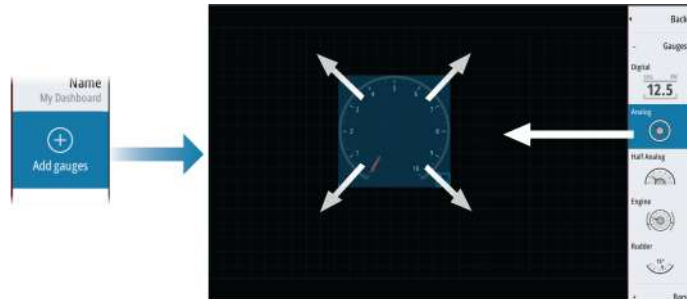
You can use edit menu options to:

- change the data for each of the gauges in any dashboard
- set limits for analog gauges
- change the dashboard layout

→ **Note:** You cannot change the layout of pre-defined dashboards or dashboards you have created using built-in templates.

## Adding gauges

Select a gauge in the menu and then position it on the dashboard.

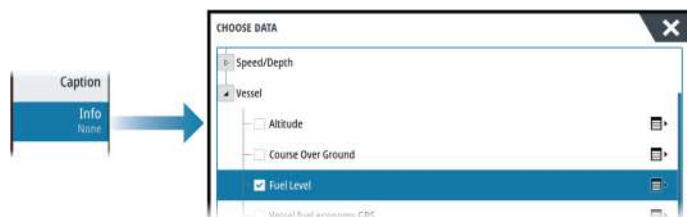


### Key operation

Use arrow keys to select the item you want to add, and press the enter key.

## Choosing gauge data

Select the gauge in the dashboard and then the info menu option to choose the data to be shown on the gauge.



## Selecting a dashboard

You switch between the dashboards by:

- swiping left or right on the panel
- selecting the dashboard from the menu

# 20

## Video

---

### About the video function

The video function allows you to view videos or camera sources on your system.

→ **Note:** The video images are not shared from the Ethernet network. You can only view the video on the unit connected to the video source.

For information about how to connect the camera, see the unit's separate installation manual.

### The video panel

The video image is proportionally scaled to fit into the video panel. Areas not covered by the image are colored black.



### Setting up the video panel

#### Video source

The unit supports two video input channels.

You can select to view one channel only, or to cycle the image between available video cameras.

The cycle period can be set from 5 to 120 seconds.

The unit also supports video input through the HDMI input connector.

#### Video standard

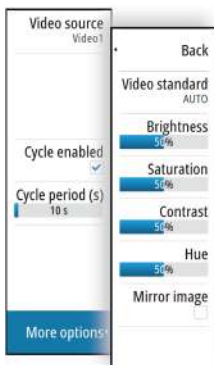
Select the video format for the connected video source.

#### Adjusting the video image

You can optimize the video display by adjusting the video image settings. The settings are adjusted individually for each video source.

#### Mirroring the video image

Video input can be set to display a mirrored image. This setting can be helpful for rear-facing cameras used to back-down the vessel.



# 21

## Audio

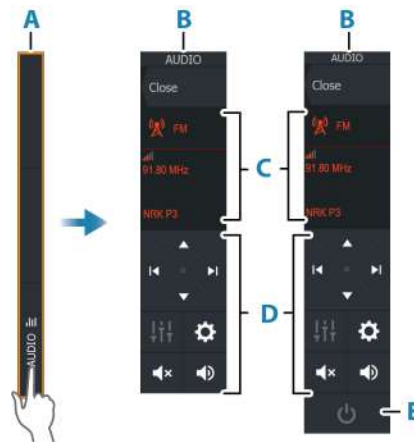
### About the audio function

If a compatible audio server is properly installed/connected and setup with your system, you can use the unit to control and customize the audio system on your vessel.

For installation, setup and connection information, refer to the unit's installation manual and to the documentation included with the audio device.

### The audio controller

The control buttons, tools and options vary from one audio source to another.



- A** Control bar
- B** Audio controller, small and large displays
- C** Source and source information
- D** Control buttons
- E** ON/OFF button  
The OFF button is located in the source list on small displays.

### Setting up the audio system

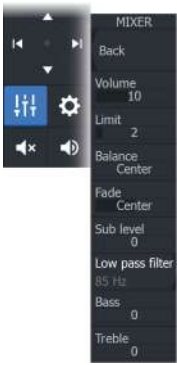
#### Audio server

If multiple audio sources are connected to the same network, one of the devices must be selected as the audio server. If only one device is present, it is the selected audio server by default.

#### Setting up the speakers

→ **Note:** The number of mixer options depends on active audio server.





### Speaker zones

This device can be set up to control different audio zones. The number of zones depends on the audio server connected to your system.

You can adjust balance, volume and volume limit settings individually for each zone. Adjustments to the bass and tremble settings will alter all zones.

### Master volume control

By default, the volume for all speaker zones are adjusted when you adjust the volume.

You can adjust each speaker zone individually. You can also define which zones that shall be altered when you adjust the volume.

## Selecting audio source

Use the source button to display the list of audio source. The number of sources depends on the active audio server.



### Bluetooth devices

If your audio server supports Bluetooth, Bluetooth will be listed as a source.

Use the Bluetooth icon in the audio controller to pair the audio server with a Bluetooth enabled device such as a smart phone or tablet.

## Using an AM/FM radio

### Selecting the tuner region

Before using FM, AM or a VHF radio, you must select the appropriate region for your location.

### Radio channels

To tune in to an AM/FM radio channel:

- press and hold the left or right audio control button

To save a channel as a favorite:

- select the favorite menu option

To page through favorite channels:

- select the up or down audio control button



### List of favorite channels

The favorite list can be used for selecting a channel, and for deleting the saved channels from the list.



## Sirius radio

→ **Note:** Sirius radio is available in North America only.

If you have a compatible Sirius XM receiver connected to your system, you can control the receiver from the Audio control bar.

Sirius service covers inland U.S. waters and coastal areas into the Atlantic and Pacific oceans, Gulf of Mexico, and the Caribbean Sea. The SiriusXM products received vary depending on your selected subscription package.

## Lists of Sirius channels

Several options are available for displaying the Sirius channels.



## Sirius favorite channels

You can create your favorite channels from within the list of all channels and the list of subscribed channels.

## Selecting a Sirius channel

To select a channel:

- select the left or right audio control button

To page through favorite channels:

- select the up or down audio control button

## Locking channels

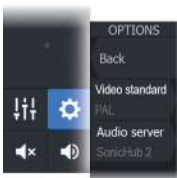
You can lock selected Sirius channels from being broadcasted. A user selected 4-digit code must be entered to lock and unlock channels.

## Viewing DVD video

If your audio server supports DVD playback, you can control the DVD player from the audio controller when the audio source is set to DVD.

## Video standard

Select the video format for the Audio server to match the display connected to the Audio server.



# 22

## Weather

### About the weather feature

The system includes weather functionality that allows the user to view forecast data overlaid on the chart. This helps gaining a clear understanding of the weather conditions that are likely to appear.





The system supports weather data in GRIB format, available for download from various weather service suppliers.

The system also supports weather data from SIRIUS Marine Weather Service. This service is available only in North America.

### Wind barsbs

The rotation of the wind barbs indicate the relative wind direction, with the tail showing the direction the wind is coming from. In the graphics below, the wind comes from the northwest.

Wind speed is indicated by a combination of small and large barbs at the end of the wind tail.

	Zero knots / Indeterminate wind direction
	Small barb = 5 knots
	Large barb = 10 knots
	Arrow barb = 50 knots

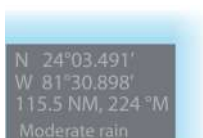
If a combination of 5 and 10 knot barbs are shown on a tail, then add them together to give you the total wind speed. The example below shows 3 x large barb + 1 x small barb = 35 knots, and 60 knots indicated with 1 x arrow barb + 1 x large barb.



### Showing weather details

If pop-up is enabled, you can select a weather icon to display the identity of the observation.

If you select the pop-up, detailed information about the observation is displayed. You can also display the detailed information from the menu when the weather icon is selected.



### GRIB weather

A GRIB file contains forecast information for a set number of days. It is possible to animate the weather data, which shows how weather systems are developing.

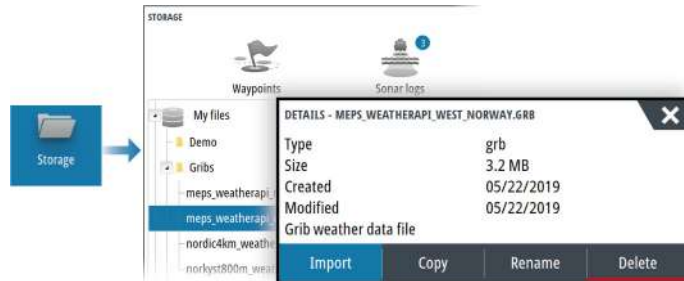
## Importing GRIB data

GRIB data imported into memory can be displayed as chart overlay. The file can be imported from any location that can be seen in the storage manager.

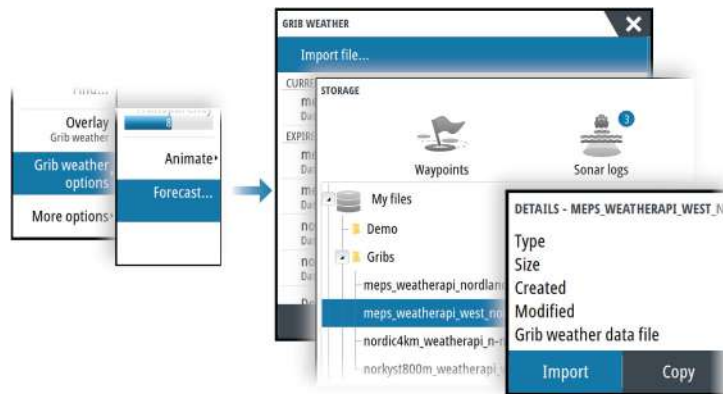
→ **Note:** GRIB data that is imported overwrites the GRIB data in memory.

You can import the GRIB files:

- From the storage manager



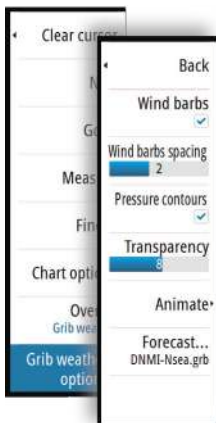
- From the forecast menu option on the chart panel. The Grib weather option is only available if Grib weather is set as the overlay on the chart.



## Displaying GRIB weather as overlay

Imported GRIB weather data can be displayed as an overlay on your chart panel.

When the GRIB weather overlay option is selected, the chart menu increases to show GRIB weather options. From this menu you can select which weather symbols you want to display, set the distance between the barbs, and adjust the opaqueness of the weather symbols.



- A** Wind barbs
- B** Pressure contours
- C** GRIB information window



## GRIB information window

The GRIB information window shows the date and time for the GRIB weather forecast, and the selected forecast time in brackets. A negative value in the brackets indicates historic weather data.

If you select a position on the chart, the information window expands to include weather details for the selected position.

## Animating GRIB weather forecast

The GRIB data contains forecast information for a set number of days. It is possible to animate the weather data and to show the predicted forecast for a specific time and date. The time scales vary depending on the file you are using.

The time shift is shown in brackets in the GRIB information window. The time is relative to the current time as provided by a GPS device connected to the system.

Select time and animation speed from the menu.

## SiriusXM weather

### About SiriusXM weather

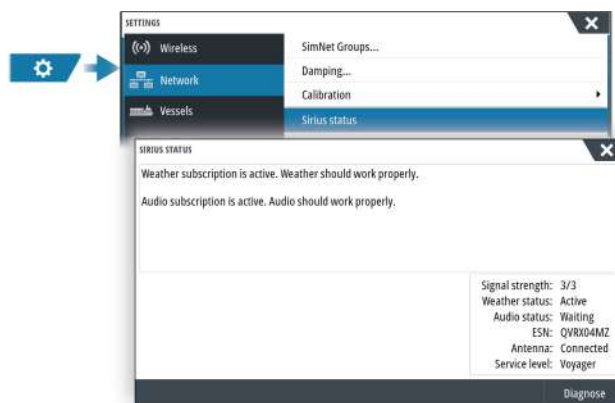
→ **Note:** SiriusXM weather is available for North America only.

When connected to a Navico weather module, you can subscribe and include Sirius marine weather service on your system.

Depending on your selected subscription package, Sirius weather service covers a variety of North American inland waters and coastal areas.

### Sirius status panel

When the weather module is connected to the system, you get access to the Sirius status panel.

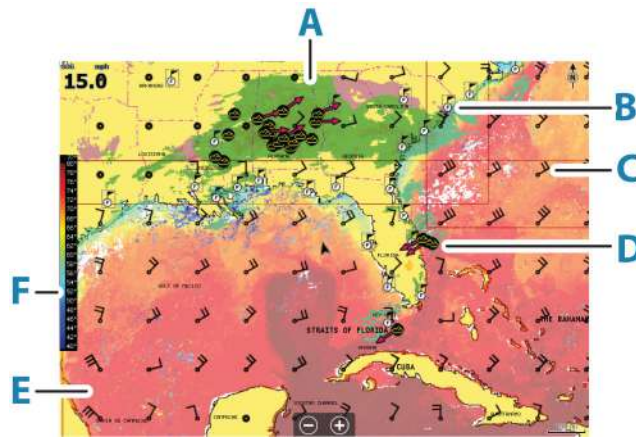


The status panel shows signal strength is indicated as 1/3 (weak), 2/3 (good) or 3/3 (preferred). It also includes antenna status, service level, and the electronic serial number for the weather module.

### Sirius weather panel

Sirius weather can be displayed as an overlay on your chart panel.

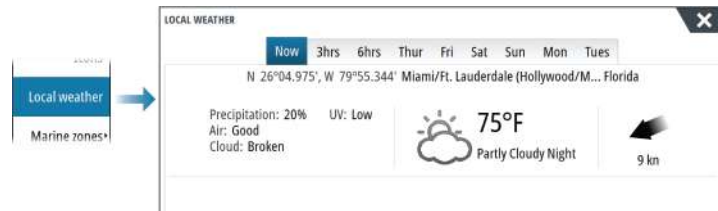
When weather overlay is selected, the chart menu increases to show the available weather options.



- A** Precipitation color shading
- B** City forecast icon
- C** Wind barb
- D** Storm icon
- E** SST color bar
- F** SST color shading

### Local weather

The local weather dialog shows current weather and weather forecast for your current location.



### Weather options

#### View options

##### Precipitation

Shades of color are used to show precipitation type and intensity. The darkest color indicates the highest intensity.

Rain	From light green (light rain) - yellow - orange - to dark red (heavy rain)
Snow	Blue
Mixed	Pink

##### Sea surface temperature (SST)

You can show the sea surface temperature as color shading or as text.

When color coding is selected, the SST color bar is shown on the left side of the display.

You define how the color codes are used to identify sea surface temperature. Refer to "Adjusting color codes" on page 126.

##### Forecast wave indication

Colors can be used to indicate forecast wave height. The highest waves are dark red, while the lowest are blue.



You can define how the color codes are used to identify the wave height. Refer to "*Adjusting color codes*" on page 126.

**Forecast wind barbs**

Forecast wind barbs can be shown or hidden on the weather panel.

**Surface features**

Turns surface features on/off. Surface features include fronts, isobars, and pressure points. Surface features cannot be shown at the same time as Wind.

**Cloud tops**

Turn Cloud tops on/off. Cloud tops indicate the height of the top of the clouds. The color palette used is grey with darker greys indicating lower clouds. Cloud tops cannot be shown at the same time as Precipitation or Echo Tops.

→ **Note:** This feature is only available for certain SiriusXM subscriptions.










**Echo tops**

Turns Echo tops on/off. Echo tops indicate the tops of storms. The color palette used is the same as for Precipitation. Echo tops cannot be shown at the same time as Precipitation or Cloud Tops.

→ **Note:** This feature is only available for certain SiriusXM subscriptions.

**Weather icons**

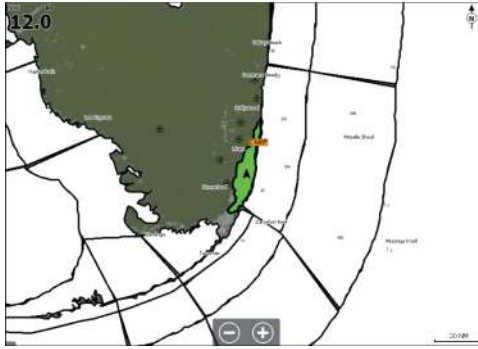
Several weather icons are available to show current or predicted weather conditions. Select an icon to display detailed weather information.

	City forecast
	Surface observation
	Tropical storm tracking; past (grey) - present (red) - future (yellow)
	Hurricane (category 1-5) tracking; past (grey) - present (red) - future (yellow)
	Tropical disturbance/depression tracking; past (grey) - present (red) - future (yellow)
	Storm attributes
	Lightning
	Watch box location and warning
	Marine zone location

**Marine zone**

Depending on your selected subscription, SiriusXM services includes access to weather reports for U.S. and Canadian marine zones, with the exception of the high seas zones.

You can select a marine zone and view its forecast. You can also select a marine zone as your current zone of interest to be notified of any weather warnings in that zone.



### **Tropical statements**

You can read tropical statements including information about tropical weather conditions. These statements are available for the entire Atlantic and the Eastern Pacific.

### **Adjusting color codes**

You can define the sea surface temperature range and wave height color coding.

The temperature above warm and below cool values is displayed as progressively darker red and darker blue.

Waves higher than the maximum value are indicated with progressively darker red. Waves lower than the minimum value are not color coded.

### **Animating weather graphics**

The weather information you have turned on is recorded. This information can be used to animate past or future weather conditions. The amount of information available in the system depends on the amount of weather activity; the more complex it is, the less time is available for animation.

You can animate the past or the future, depending on which weather view you have turned on:

- with precipitation overlay, you can animate for the past and only assume weather conditions in the immediate future.
- with colored wave height overlay, you can animate the future (the predictions).

When activated, the time for the current graphic animation is displayed in the panel.



### **Transparency**

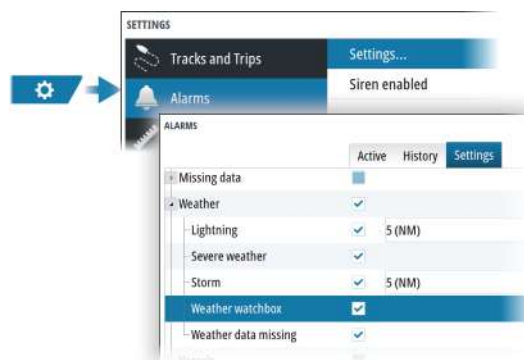
Adjusts the transparency of the overlay.

## **Weather alarms**

You can setup lightning or storm alarms to occur when the conditions are within a certain range of your vessel.

You can also set up an alarm as a severe weather forecast alarm issued for your chosen marine zone.

A watchbox is defined by the National weather service. When the alarm for watchbox is turned on, an alarm occurs when your vessel is entering or inside a watchbox.



# 23

## Internet connection

### Internet usage

Some features in this product use an internet connection to perform data downloads and uploads.

Internet usage via a connected mobile/cell phone internet connection or a pay-per-MB type internet connection may require large data usage. Your service provider may charge you based on the amount of data you transfer. If you are unsure, contact your service provider to confirm rates and restrictions.

### Ethernet connection

The unit is automatically connected to the internet when connected to an Ethernet network with internet access.

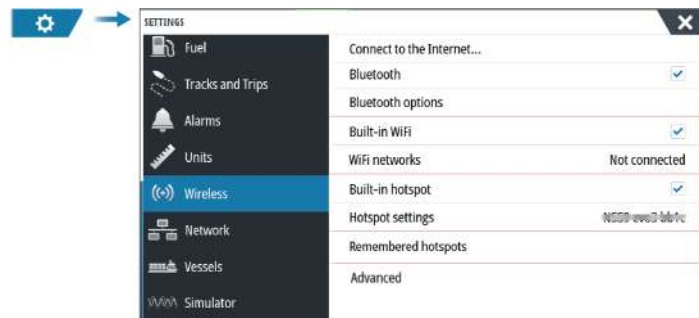
### WiFi connection

Use the WiFi functionality to:

- Connect the unit to the internet. For more information, refer to "*Wireless settings*" on page 127.

### Wireless settings

Provides configuration and setup options for the wireless functionality.



### Connect to the internet

Used for connecting to a hotspot which has internet access.

When connected, the text changes to include Already connected.

### Bluetooth

Enables the built-in Bluetooth functionality.

### Bluetooth devices

Displays the Bluetooth device dialog. Use this dialog to pair or remove pairing to Bluetooth enabled devices.

Select a device to:

- display device details
- connect, disconnect or remove the device from the device list



### **Built-in WiFi**

Select this option to enable or disable the internal WiFi.

Disabling the internal WiFi reduces the unit's power consumption.

### **WiFi networks**

Shows the WiFi network connection status. If the MFD is connected to the internet (WiFi hotspot), the hotspot name (SSID) is shown.

### **Built-in hotspot**

The system turns this on when connecting with another unit.

### **Hotspot settings**

Select to display the MFD's hotspot network name (SSID) and key. Only available when the MFD built-in hotspot is turned on.

### **Remembered hotspots**

Displays hotspots the unit has been connected to in the past.

### **Advanced**

Tools are available within the software to assist in fault-finding and setting up the wireless network.

#### ***DHCP Probe***

The wireless module contains a DHCP server that allocates IP addresses for all the MFDs, and devices in a network. If integrating with other devices, such as a 3G modem or satellite phone, other devices in the network may also be acting as DHCP servers. To make it easy to find all DHCP servers on a network, dhcp\_probe may be run from the unit. Only one DHCP device may be operational on the same network at a time. If a second device is found, turn off its DHCP feature if possible. Refer to the device's own instructions for further assistance.

→ **Note:** Iperf and DHCP Probe are tools provided for diagnostic purposes by users familiar with network terminology and configuration. Navico is not the original developer of these tools, and cannot provide support related to their use.

#### ***Iperf***

Iperf is a commonly used network performance tool. It is provided for testing wireless network performance around the vessel so weak spots or problem areas can be identified. The application must be installed on and run from a tablet device.

The unit must be running Iperf server before initiating the test from the tablet. On exiting the page, Iperf automatically stops running.

# 24

## Using your phone with the MFD

### About phone integration

The following functions are available when connecting a phone to the unit:

- read and send text messages
- view caller ID for incoming calls

iPhone limitations:

- only incoming calls and messages received while the phone is connected to the MFD are available
- messages cannot be sent from the MFD. iPhone does not support sending messages from connected Bluetooth devices.

### Connecting and pairing a phone

- **Note:** Bluetooth must be enabled on your phone before you can connect to the MFD.
- **Note:** If you want to pair a phone while another phone is connected to the MFD, see "*Managing Bluetooth devices*" on page 131.
- **Note:** You must always connect to a phone from the MFD, not the other way around.

Use the phone icon in the toolbar to connect your phone to the MFD. When the icon is selected the following happens:

- Bluetooth is turned ON in the MFD
- the Bluetooth dialog opens, listing all Bluetooth enabled devices within range



To pair a phone listed as **other devices** in the dialog:

- select the phone you want to pair, and follow the instructions on the phone and on the MFD

When paired, the phone is moved to the **paired device** section in the dialog.

To connect a paired phone:

- select the phone you want to connect to

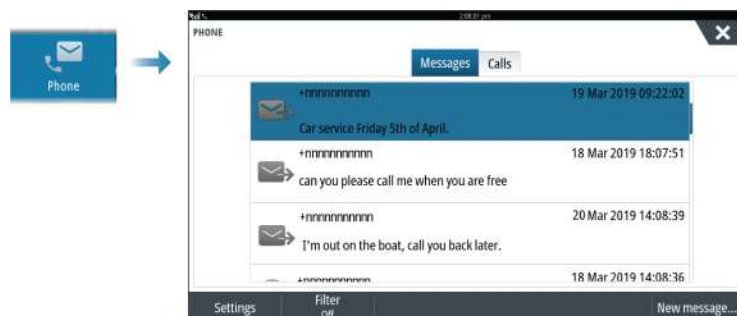


When the phone and the unit are connected, a phone icon is shown on the status bar.

Incoming messages and phone notifications will now pop-up on the MFD.

### Phone notifications

After the phone and unit are paired and connected, use the phone icon to display the list of messages and the call history.



By default, the message list shows all messages. The list can be filtered to show only sent or received messages.

### Creating a text message

→ **Note:** This option is not available for iPhones.

To create a new text message:

- select the new message option in the message dialog

To respond to a text message or to a phone call:

- select the message or call you want to respond to



### Responding to an incoming call

A call must be answered or rejected from the phone.

You can respond to an incoming call by a text message (not available for iPhones).

### Message settings

You can define message templates and set how you want the alert to appear in the settings dialog.



## Phone troubleshooting

### Not possible to connect an iPhone

The first time an MFD attempts to connect to an iPhone, the following errors might appear:

- connection failing, giving a message saying that the phone is not available for connection
- the phone does not list the correct name for the MFD

If this happens, try the following:

- reboot the MFD and restart the phone
- check that the phone is not connected to any other Bluetooth devices
- manually set the iPhone to allow notifications from the MFD:



### Missing notifications

By default, the connection profile for the phone is set to **auto**.

The connection profile should be changed to **alternative** if one of the following issues occurs:



- the phone is connected and the alert type is set to pop-up or notification, but there is either no alert or the alert is very delayed
- the phone is connected and there is no sound on the phone when talking



See details for how to display the device details in *"Managing Bluetooth devices"* on page 131. To change the alert setting for the phone notifications, see *"Message settings"* on page 130.

### **Text messages appearing on the iPhone, but not on the MFD**

Check that the text app is not open and active on the iPhone.

## **Managing Bluetooth devices**

Bluetooth enabled devices within range are shown in the Bluetooth devices dialog. Refer to *"Bluetooth devices"* on page 127.

# 25

## Simulator

### About

The simulation feature lets you see how the unit works without being connected to sensors or other devices.

The status bar indicates if the simulator is toggled on.



### Retail mode

In this mode a retail demonstration for the selected region is shown.

If you operate the unit when retail mode is running, the demonstration pauses.

After a time-out period, retail mode resumes.

→ **Note:** Retail mode is designed for retail/showroom demonstrations.

### Simulator source files

You can select which data files that are used by the simulator. It can be either pre-recorded data files included in your device, your own recorded log files, or log files on a mass storage device connected to the unit.



### Advanced simulator settings

The advanced simulator settings allows for manually controlling the simulator.



# 26

## Tools and settings

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This chapter includes description for tools and for settings that are not specific to any application panel.

For application settings, refer to the relevant chapter for the application.

Tools and settings are available from the Home page.

### The toolbar



#### Waypoints

Includes waypoints, routes, and trails dialogs used for managing these user defined items.

#### Tides

Displays tide information for the tide station nearest to your vessel. The system will show available tide stations, selected one from the list to see details.

#### Alarms

Dialogs for active and historical alarms. Also including the alarm settings dialog, listing options for all available system alarms.

#### Vessels

The status list displays status and available information for the following vessel types:

- AIS
- DSC

See details in "AIS" on page 61.

#### Tripletel

Tripletel lets you store and recall information on trips. Refer to "Tripletel" on page 47.

#### Sun, Moon

Displays sunrise, sunset, moonrise and moonset for a position based on entered date and the position's latitude/longitude.

#### Storage

Access to the file management system. Use to browse and manage the contents of the unit's internal memory and storage devices connected to the unit.

#### Find

Search function for chart items (waypoints, routes, tracks, etc.).

#### Store

Connects to the Navico internet store. At the store you can browse, purchase, acquire feature unlock keys, download compatible charts/maps for your system and much more.

→ **Note:** The unit must be connected to the internet to use this feature. Refer to "Internet connection" on page 127.

### Settings

## System settings



### Language

Controls the language used on this unit.

### Boat settings

Used to specify the physical attributes of the boat.

### Text size

Used for setting the text size in menus and dialogs.

### Key beeps

Controls the loudness of the beep sound that occurs when physical interaction is made with the unit.

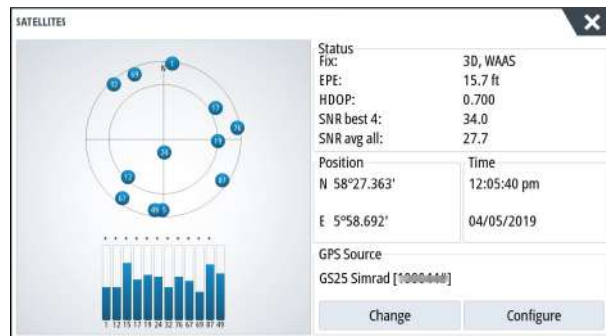
### Time

Configure time settings to suit vessel location, along with time and date formats.

### Satellites

The Satellites option displays a graphical view and numeric values for available satellites.

→ **Note:** The content in the Satellites dialogs varies with connected antenna.



From within this dialog you can select and configure the active GPS sensor.

### PIN code

Sets a PIN code to prevent unauthorized access to your system's settings.

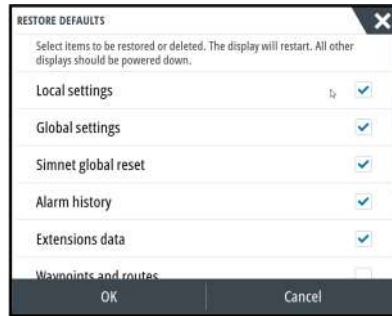
**Note:** Record the PIN code and store it in a safe place.

When you establish password protection, the PIN code must be entered when any of the following are selected. After the correct PIN code is entered, all of them can be accessed without re-entering the PIN code.

- Settings, activated from the home page or system controls dialog
- Alarms, activated from the toolbar
- Storage, activated from the toolbar
- Store, activated from the toolbar

### Restore defaults

Restores selected settings to default factory values.



### **Power control**

Setting that determines unit's response to the signal applied to the power control wire. For more information, refer to the unit's installation manual.

### **Advanced**

Used for configuration of advanced settings and how your system displays various user interface information.

### **Registration**

Guidance for online registration of the device.

### **About**

Displays copyright information, software version, and technical information for this unit. The Support option accesses the built-in service assistant, refer to "*Service report*" on page 140.

### **Services**

Used for accessing web sites that provide feature services.

# 27

## Alarms

### About the alarm system

The system continuously checks for dangerous situations and system faults while the system is running.

### Type of messages

The messages are classified according to how the reported situation affects your vessel. The following color codes are used:

Color	Importance
Red	Critical alarm
Orange	Important alarm
Yellow	Standard alarm
Blue	Warning
Green	Lite warning

### Alarm indication

An alarm situation is indicated with:

- an alarm pop up message
- an alarm icon in the status bar, and with the status bar pulsing with the color of the alarm

If you have enabled the siren, the alarm message is followed by an audible alarm.

A single alarm is displayed with the name of the alarm as the title, and details for the alarm.

If more than one alarm is active at the same time, the alarm pop-up can display 3 alarms. The alarms are listed in the order they occur with the last activated alarm at the top. The remaining alarms are available in the alarms dialog.



### Acknowledging a message

The alarm dialog options for acknowledging a message vary depending on the alarm:

- Close  
Sets the alarm state to acknowledged. The siren/buzzer stops and the alarm dialog is removed.  
However, the alarm remains active in the alarm listing until the reason for the alarm has been removed.
- Disable  
Disables the current alarm setting. The alarm does not show again unless you turn it back on in the alarm settings dialog.

There is no time-out on a message or the siren. They remain active until they are acknowledged or until the reason for the message is rectified.

### Alarms



#### Siren enabled

Enables/disables the siren.

## Alarm dialogs

The alarm dialogs are activated from the Alarm settings dialog or by selecting the Alarm button on the toolbar.



### **Active alarms**

Lists all active alarms with details. Alarms remain active until the alarm is acknowledged or the reason for the alarm is removed.

### **Alarms history**

Lists the alarm history with time stamp. The alarms remain in the list until they are manually cleared.

### **Settings**

List of all available alarm options in the system, with current settings.

From this list you can activate, deactivate and change alarm limits.

# 28

## Maintenance

### Preventive maintenance

The unit does not contain any field serviceable components. Therefore, the operator is required to perform only a very limited amount of preventative maintenance.

### Sun cover

It is recommended that you always fit the sun cover when the unit is not in use.

### Cleaning the display unit

To clean the screen:

- A micro-fiber or a soft cotton cloth should be used to clean the screen. Use plenty of water to dissolve and take away salt remains. Crystallized salt, sand, dirt, etc. can scratch the protective coating if using a damp cloth. Use a light fresh water spray then wipe the unit dry with a micro-fiber or a soft cotton cloth. Do not apply pressure with the cloth.

To clean the housing:

- Use warm water with a dash of liquid dish soap or detergent.

Avoid using abrasive cleaning products or products containing solvents (acetone, mineral turpentine, etc.), acid, ammonia, or alcohol as they can damage the display and plastic housing.

Do not:

- use a jet or high pressure wash

### Checking the connectors

Push the connector plugs into the connector. If the connector plugs are equipped with a lock or a position key, ensure that it is in the correct position.

### Touchscreen calibration

Use the system setting option to calibrate the touchscreen.



### Software updates

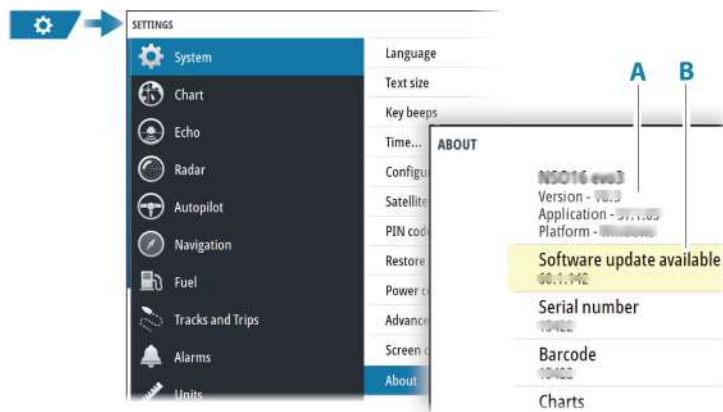
Before initiating an update to the unit, be sure to back up any potentially valuable user data. Refer to *"Backing up your system data"* on page 140.

### Installed software and software updates

The about dialog shows the software version currently installed on this unit **(A)**.

If the unit is connected to internet, the dialog also shows available software updates **(B)**.



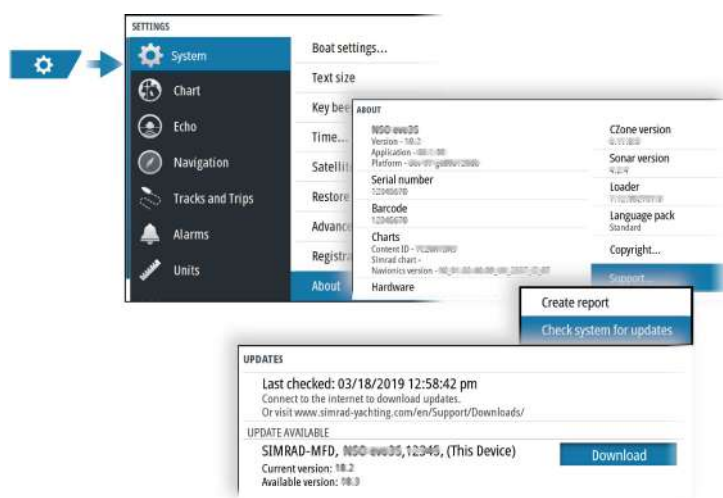


## Update the software when connected to internet

If the unit is connected to internet, the system will automatically check for software updates for the unit and for connected devices.

- **Note:** Some software update files might be larger than the space available in the unit. If so, you will be prompted to insert a storage device.
- **Note:** Do not add software update files to a chart card.
- **Note:** Do not turn off the unit or a remote device until the update is completed, or until you are prompted to restart the unit.

You will be notified if new software updates are available. You can also manually start the update(s) from the Updates dialog.



## Update the software from a storage device

You can download the software update from

Transfer the update file(s) to a compatible storage device, and then insert the storage device in the unit.

- **Note:** Do not add software update files to a chart card.

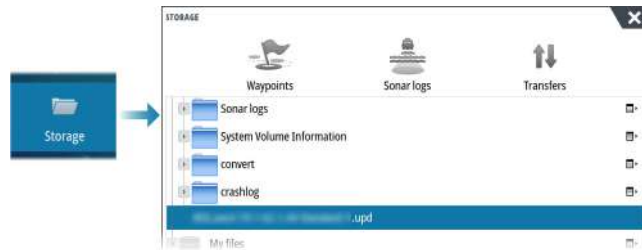
To update this unit only:

- restart the unit to start the update from the storage device

To update this unit or a connected device:

- Select the update file in the dialog

- **Note:** Do not turn off the unit or a connected device until the update is completed, or until you are prompted to restart the unit.



## Service report

The system has a built-in service assistant that creates a report about the unit. The service report is used to assist in technical support enquiries.

It can also include information about devices connected to the network(s).

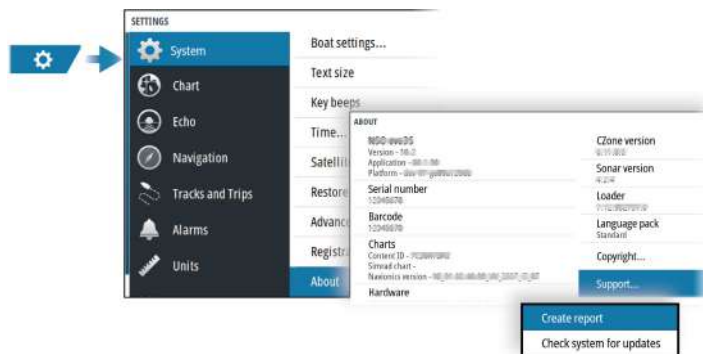
The report includes the software version, serial number, and information from the settings file.

If you call technical support before creating the report, you can enter an incident number to assist with tracking. You can attach screenshots and log files to the report.

→ **Note:** There is a 20MB limit for the report attachments.

The report can be saved to a storage device and emailed to support.

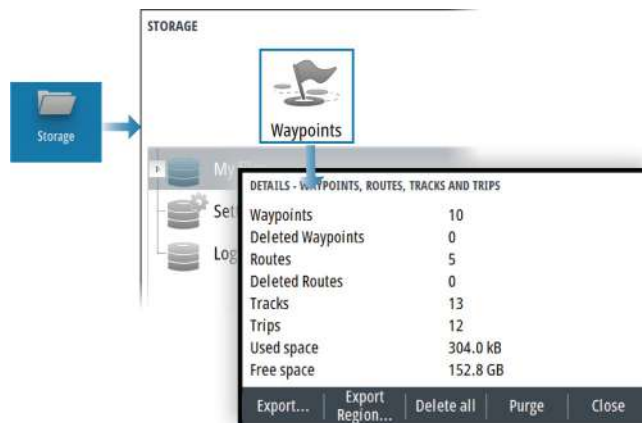
You can also upload it directly if you have an internet connection.



## Backing up your system data

It is recommended to regularly copy user data and your system settings database as part of your back-up routine.

## Waypoints



The waypoints option in the storage dialog allows for managing user data.

## Export format

The following formats are available for export:

- **User Data File version 6**  
Used to export waypoints, routes and colored tracks/trails.
- **User Data File version 5**  
Used to export waypoints and routes with a standardized universally unique identifier (UUID), which is very reliable and easy to use. The data includes such information as the time and date when a route was created.
- **User Data File version 4**  
Best used when transferring data from one system to another, since it contains all the extra bits of information these systems store about items.
- **User Data file version 3 (w/depth)**  
Should be used when transferring user data from one system to a legacy product
- **User data file version 2 (no depth)**  
Can be used when transferring user data from one system to a legacy product
- **GPX (GPS Exchange, no depth)**  
This is the format most used on the web that shares among most GPS systems. Use this format if you are taking data to a competitor's unit.

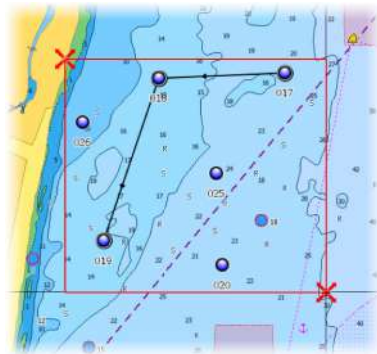
### **Export all waypoints**

The export option is used for exporting all waypoints, routes, tracks and trips.

### **Export region**

The export region option allows you to select the area from where you want to export data.

1. Select the export region option
2. Drag the boundary box to define the desired region



3. Select the export option from the menu
4. Select the appropriate file format
5. Select the export option to export to the memory card

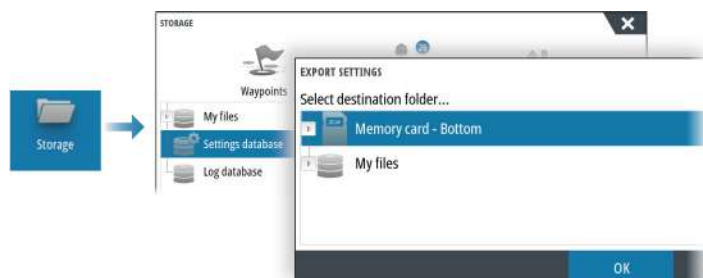
### **Purging user data**

Deleted user data are stored in the unit's memory until the data is purged. If you have numerous deleted, unpurged user data, purging may improve the performance of your system.

→ **Note:** When user data is deleted and/or purged from the memory, it cannot be recovered.

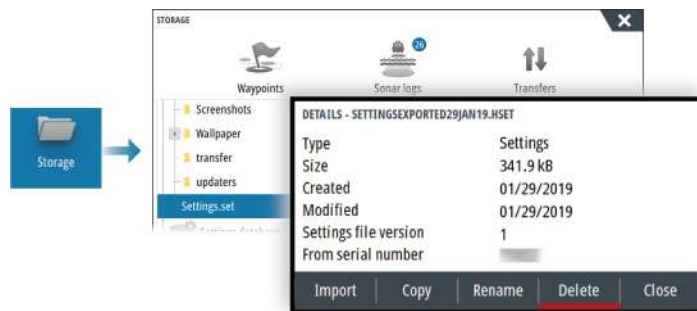
### **Exporting the settings database**

Use the settings database option in the storage dialog to export your user settings.



## Import system settings

**⚠ Warning:** Importing system settings overwrites all existing system settings.



- 1 Connect a storage device to the unit
- 2 Browse the memory and select the desired backup file to start the import

# 29

## Integration of 3<sup>rd</sup> party devices

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Several 3<sup>rd</sup> party devices can be connected to the unit. The applications are displayed on separate panels or integrated with other panels.

A device connected to the NMEA 2000 network should automatically be identified by the system. If not, enable the feature from the advanced option in the System settings dialog.

The 3<sup>rd</sup> party device is operated by using menus and dialogs as on other panels.

This manual does not include specific operation instructions for any 3<sup>rd</sup> party device. For features and functionality, refer to the documentation included with the 3<sup>rd</sup> party device.

### SmartCraft VesselView integration

When a compatible Mercury Marine VesselView product or VesselView Link is present on the NMEA 2000 network, the engines can be monitored and controlled from the unit.

When the feature is also enabled in the advanced settings features dialog:

- A Mercury icon is added to the home page - select it to display the engine instrument panel.  
You can customize which data is displayed on the instrument panel. Refer to *"Instruments"* on page 114.
- A Mercury settings dialog is added - use this dialog to change engine settings.
- Mercury and Vessel Control buttons are added to the control bar:
  - Selecting the Mercury button displays engine and vessel data.
  - Selecting the Vessel button opens the engine controller.

When the features are enabled, the display may prompt the user for some basic configuration information.

For more information, refer to the VesselView manual or engine supplier.

### FLIR camera control

If a compatible FLIR M-series camera is available on the Ethernet network, you can display the video and control the camera from the system.

When the connection is established to a compatible FLIR camera, the menu changes to include access to FLIR camera controls.

→ **Note:** You can take over camera control from any unit connected to the Ethernet network.

### Establishing connection with the FLIR video camera

When a video panel is active, the unit automatically recognizes the compatible FLIR camera if it is available on the Ethernet network.

→ **Note:** When there is a DHCP server present on the Ethernet network, the FLIR camera needs to be configured and set to have a Static IP Address before the connection can be established. For instructions on how to configure your specific FLIR camera model, refer to FLIR documentation.

→ **Note:** Only one FLIR camera can be connected to the Ethernet network.

When you activate a video panel, the system starts searching the Ethernet network for a compatible FLIR camera.

Lost connections are indicated on the panel. Select the indication to re-establish the connection.

When the connection is established the menu changes to include access to FLIR camera control.

→ **Note:** You can take over camera control from any compatible unit connected to the Ethernet network.

## Panning and tilting the FLIR camera

When the connection to the FLIR camera is established, pan and tilt panel buttons appear on the video panel. The left and right arrow buttons control the camera's pan. The up and down arrow buttons tilt the camera.

Select one of the arrow buttons on the panel to control the camera. The camera continues to move for as long as you press the button.

## Zooming the FLIR video image

You zoom the video image by using the zoom panel buttons.

There are two zoom options available, depending upon your selected FLIR camera source option:

- Digital zoom  
Only available when the camera is in Infrared mode. In this mode, the zoom is represented in levels (0, 2 and 4 times zoom). Each press on a zoom button increments or decrements the zoom level.
- Optical zoom  
Available in daylight mode. In this mode, the camera continues to zoom for as long as you press a zoom panel button.

## The FLIR camera's home position

You can set the current pan and tilt position as the camera's home position.

You can later quickly return to this camera position.

## The FLIR camera source options

The FLIR camera includes both daylight and infrared video sources.

When the infrared source is selected, the following options are available:

- Toggle color scheme  
Cycles through FLIR's video output color scheme. Each of these schemes maps a different color to a different temperature.
- Toggle polarity  
Inverts the color scheme.

## Suzuki engine integration

If a Suzuki C-10 gauge is available on the NMEA 2000 network, the engines can be monitored from the unit.

When the feature is also enabled in the advanced settings features dialog:

- A Suzuki icon is added to the home page - select it to display the engine instrument panel.  
You can customize which data is displayed on the instrument panel. Refer to "*Instruments*" on page 114.

For more information, refer to the engine manual or engine supplier.

## Yamaha engine integration

If a compatible Yamaha gateway is connected to the NMEA 2000 network, the engines can be monitored from the unit.

When the feature is also enabled in the advanced settings features dialog:

- A Yamaha icon is added to the home page - select it to display the engine instrument panel.  
You can customize which data is displayed on the instrument panel. Refer to "*Instruments*" on page 114.
- If the Yamaha system supports Troll Control, a Troll button is added to the control bar.  
Select this button to enable/disable troll control and control the trolling speed.

For more information refer to the engine manual or the engine supplier.

## Evinrude engine integration

If an Evinrude engine control head is available on the NMEA 2000 network, the Evinrude engines can be monitored and controlled from the unit.

When the feature is also enabled in the advanced settings features dialog:

- An Evinrude icon is added to the home page - select it to display the engine instrument panel.  
You can customize which data is displayed on the instrument panel. Refer to *"Instruments"* on page 114.
- An Evinrude settings dialog is added - use this dialog to change engine settings.
- An Evinrude button is added to the control bar - selecting this button opens the engine controller. Use the engine controller to control the engines.

A maximum of two control heads and four engines is supported.

For more information, refer to the engine manual or engine supplier.

## FUSION-Link integration

Compatible FUSION-Link devices connected to the system can be controlled from the system.

The FUSION-Link devices appear as additional sources when using the audio function. No additional icons are available.

Refer to *"Audio"* on page 118 for more information.

## BEP CZone integration

The unit integrates with BEP's CZone system used for controlling and monitoring a distributed power system on your vessel.

The CZone icon is available in the toolbar on the Home page when a CZone system is available on the network.

A separate manual is provided with your CZone system. Refer to this documentation and to the unit's Installation manual for how to install and configure the CZone system.

### CZone dashboard

When the CZone is installed and configured, an additional CZone dashboard is added to the instrument panels.

You switch between a panel's dashboards by swiping left or right on the panel or by selecting the dashboard from the menu.

### Editing a CZone dashboard

You can customize a CZone dashboard by changing the data for each of the gauges. Available editing options depend on the type of gauge and which data sources that are connected to your system.

For more information, refer to *"Instruments"* on page 114.

## Power-Pole anchors

Power-Pole anchors, which can be controlled by the C-Monster Control System installed on your boat, can be controlled from the unit. To control the Power-Poles, you pair the Power-Poles with the unit using Bluetooth wireless technology available in both products.

### Power-Pole controls

When Bluetooth is enabled, the Power-Pole button becomes available in the control bar. Select it to display the Power-Pole controller.

For pairing Bluetooth devices, refer to *"Bluetooth devices"* on page 127.

If you are pairing dual Power-Poles, also review *"Pairing with dual Power-Poles"* on page 146.

When the Power-Pole controller is opened, the system connects to paired Power-Poles. When the connection is confirmed the control buttons are enabled.



The Power-Pole controller displays control buttons for each Power-Pole that is paired to the unit.

Single press the AUTO buttons to raise and lower the Power-Poles automatically all the way up and down. The manual up and down buttons raise and lower the poles as high or low as you want.



Single Power-Pole controller



Dual Power-Poles controller



On a dual controller you can raise and lower the Power-Poles separately, or press the sync (links) button to allow for control of both with a single press of the auto buttons or the manual up and down buttons.



### Stay connected

Select the Settings button on the Power-Pole controller to open the Power-Pole Settings dialog where you can select to stay connected to all paired Power-Pole anchors.

→ **Note:** Selecting to Stay connected speeds up access to the controls, but the anchors cannot be controlled from another unit when it is selected. Turn off this option to allow connection from other units.

The Power-Pole Settings dialog also provides the option to add or remove Power-Poles. This option opens the same Bluetooth Devices dialog you open from the Wireless settings dialog. Refer to "Bluetooth devices" on page 127.

### Pairing with dual Power-Poles

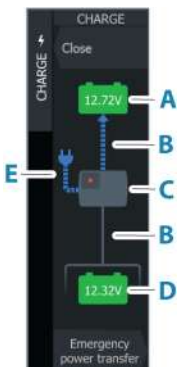
If dual Power-Poles are installed on your boat, the one that is paired first automatically becomes Port and the second is set to Starboard in the Power-Pole controls.

To swap them around, unpair the connected Power-Poles. And then, toggle off and on Bluetooth in the Wireless settings dialog to reset the Bluetooth memory. Once Bluetooth has been toggled back on, proceed in pairing the Power-Poles in the correct order.

## Power-Pole Charge module

The Power-Pole battery charge management system displays battery status information.

For installation, wiring and setup information, refer to the Power-Pole documentation supplied with the charge module.



- A** Engine battery/batteries
- B** Battery connections
- C** Power-Pole charge module
- D** Auxiliary battery/batteries
- E** Charge module AC power source connection



## Battery icons

Color	Indicates
Green	Good level
Yellow	Marginal level
Red	Failing/critical level

## Battery and AC source connections

Color	Indicates
Blue	Current flow
Grey	No current flow

## Emergency power transfer

If your engine battery is low and you want to transfer power from the aux battery to the engine battery, select this option.

**⚠ Warning:** Using a battery at a very low charge level can damage the battery.

## Naviop

If this device is on the same NMEA 2000 network as a Naviop Loop system, this device can be used to operate the Naviop Loop system.

For details, refer to the documentation following the Naviop system.










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## Appendix

### Touchscreen operation

Basic touchscreen operation on the different panels is shown in the table below.

The panel sections in this manual have more information about panel specific touchscreen operation.

Icon	Description
	Tap to: <ul style="list-style-type: none"><li>• Activate a panel on a multi-panel page</li><li>• Position the cursor on a panel</li><li>• Select a menu and a dialog item</li><li>• Toggle a checkbox option on or off</li><li>• Show basic information for a selected item</li></ul>
	Press and hold: <ul style="list-style-type: none"><li>• On any panel with a cursor to either activate the cursor assist feature or open the menu. Refer to <i>"Customizing the long press feature"</i> on page 18.</li><li>• On the Instrument bar to open the Choose data dialog.</li><li>• On a panel button on the home page to see available split screen options.</li><li>• On a favorite button on the home page to enter edit mode.</li></ul>
	Scroll through a list of available options without activating any option. On a slide bar, move the slide up or down.
	Flick to quickly scroll through e.g. the waypoint list. Tap the screen to stop the scrolling.
	Pan to position a chart or sonar image on the panel.
	Pinch to zoom out on the chart or on an image. → <b>Note:</b> Not available for zooming sonar images.
	Spread to zoom in on the chart or on an image. → <b>Note:</b> Not available for zooming sonar images.

## Keyboard operation overview

All keys on the keyboard work as usual when entering text in a text field.

Keyboard operation and shortcuts are shown in the table below. Unless noted all references are single short presses on the key.

→ **Note:** The shortcuts refer to US keyboard layout. Some shortcuts may not work on different national keyboards.

Keyboard keys	Function
Menu	Opens the menu
Ctrl + M	
F1	Opens the Home page
Ctrl + P	
F2	Opens the Chart page
Ctrl + H	
F3	Opens the Radar page
Ctrl + R	
F4	Opens the Echo page
Ctrl + E	
F5	Opens the Nav page
Ctrl + N	
F6	Opens the Instrument page
Ctrl + I	
F12 (press and hold)	Positions a MOB mark at vessel position
Ctrl (double click)	Switches control to next monitor connected to the unit (USB port must be set to switchable) → <b>Note:</b> This is not applicable for all units.
Ctrl + B	Centers the chart on vessel position
Ctrl + D	Switches between panels on a multi-panel page
Ctrl + G	Opens the Goto menu
Ctrl + K	Places a waypoint at vessel/cursor position
Ctrl + L	Acts as the Wheel key, which can be configured.
Ctrl + O	Opens the New Waypoint dialog
Ctrl + Q	Opens the System Controls dialog
Ctrl + S	Switches the autopilot system to STANDBY mode
Ctrl + U	Switches the autopilot system to Heading hold mode
Ctrl + ;	Displays the Favorite panel as pop-up on active page
Ctrl + \	Take screenshot
PrintScn	
Esc	Cancels changes and returns to previous menu level Closes an open menu
Enter	Activates/confirms current selection
Arrow keys	Move the cursor on the panel, and maneuvers in the menus/ dialogs. On a slide bar, up/down arrows to move the slide up or down.
- and +	Zoom







## Using the mouse to control the system
















The mouse pointer becomes visible when you move the mouse, and it will auto-hide after a few seconds of inactivity.

- Press the left key to position the cursor on a panel or to select an option.
- Press and hold the left key and drag the mouse to:
  - Perform drag, flick, or swipe actions
  - Select text in an input field
  - Pan a chart
  - Pan to view sonar history or depth
  - Move the slide up or down on a slide bar
- Use the scroll wheel to zoom a zoomable panel or image, or to scroll through menu and dialog options.
- The use of the right key depends on if the cursor is active or not.
  - With active cursor: press the right key to display information about the item at cursor position.
  - Without active cursor: press the right key to toggle the panel menu on/off.

## Status bar icon definitions

Depending on your system and set up, the following icons can appear on the status bar:

Icon	Definition
	Alarm - a standard (yellow), important (orange) or critical (red) alarm is sent. To remove the icon in the status bar, acknowledge the alarm in the Alarms dialog. If needed, change the alarm setting or remedy the situation so the same alarm is not resent immediately by the system.
	Autopilot modes: Auto-Heading hold, Follow up, Navigation, No drift, Standby. Use the autopilot controller to select an autopilot mode.
	Autopilot turns - autopilot is turning the vessel in a turn mode: C turn, Depth turn, S turns, Spiral turn, Square turn, ZigZag turns. In most cases, when the turn is completed the turn icon is replaced with an autopilot mode icon. Use the autopilot controller to select an autopilot turn or cancel the turn.
	Downloading files, e.g.: software update file, logs from C-MAP Genesis, GRIB weather files, PredictWind routes, etc.
	The unit is connected to the internet. The unit can be used to download or upload files to the internet.
	No GPS signal. Clear view between the antenna and satellites with no obstructions is best. The placement of the GPS and obstructions between it and satellites can affect the signal strength (e.g. placing the GPS antenna in a room with metal walls and/or ceiling). Weather conditions can also affect the signal. Check cables and connectors if your system has an external GPS antenna. To see status of satellite signal fixes, open the system settings dialog and select the Satellites option.

Icon	Definition
	GPS signal strength: strong, medium, and weak. The placement of the GPS and obstructions between it and satellites can affect the signal strength. In some cases, a well-placed external GPS antenna might be needed.
	GPS signal strength with the Wide Area Augmentation System (WAAS) is strong, medium, and weak.
	An external keyboard is connected to the unit.
	An external mouse is connected to the unit.
	A mobile (cell) phone is connected to the unit via Bluetooth.
	The system is simulating. Turn ON/OFF the simulator from the simulator settings dialog.
	Radar is paused. If you want the radar to transmit, select the transmit option in the Radar page menu.
	Radar is transmitting. If you want to pause the radar, select the pause option in the Radar page menu.
	An OP40 remote controller is connected to the unit
	An ZC1 remote controller is connected to the unit
	An OP50 or ZC2 remote controller is connected to the unit
	The system is synchronizing data during startup.
	File transfer problem, caused by an interruption in the internet communication.
	Trip recording. For more information, open the TripIntel tool option.
	Uploading files, e.g.: service report, C-MAP genesis, route files to PredictWind, etc.